

# TRANSACTIONS

OF THE

## Seventh International Congress of Hygiene and Demography.

LONDON, AUGUST 10TH-17TH, 1891.

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Patron:—HER MAJESTY THE QUEEN.

President:—H.R.H. THE PRINCE OF WALES, K.G.

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### VOLUME IX.

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#### SECTION IX.

#### STATE HYGIENE.



EDITED BY C. E. SHELLY, M.A., M.D.,  
Assisted by the HONORARY SECRETARIES of the SECTION.

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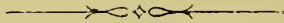


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## SECTION IX.

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### STATE HYGIENE.

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Tuesday, 11th August 1891.

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The Chair was successively occupied by  
The President, LORD BASING.  
SIR CHARLES CAMERON (Dublin).  
The EARL OF MEATH.

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#### Presidential Address.

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Lord Basing, in his introductory address, spoke of the importance of the Congress, which constituted, he said, an epoch in the history of nations. Though he had no professional claim on their attention, it had fallen to his lot to be associated with the administration of public health in this kingdom, and he was therefore cognisant of the successive steps by which that system of administration had been built up during the last half-century. It must be admitted that in England they had never had any attempt by responsible statesmen to lay down *a priori* any code having reference to the public health. The matter had grown up in a somewhat clumsy and English fashion, growing up from the experience of mankind, and gradually ripening to something definite and satisfactory. The provisions of the various public and sanitary Acts which were passed during the early part of the time he alluded to were founded for the most part on the best of all foundations, experience. In the early days when attention was drawn to the need of drainage, water-supply, cleansing, and services of that kind, the great towns of the kingdom, stimulated, no doubt, after a while by the successful working of that great statute, the Municipal Corporations Act, led the way in applying to Parliament for private Acts to enable them to do that which, without parliamentary sanction, they had no legal title or obligation to do, to borrow money and expend it on useful sanitary works, and to improve in that respect the health of the communities over which they held sway. Parliament, therefore, seeing the growing need of administration of the kind, by general Acts enabled urban localities, distinct from the great corporations and towns which already had their municipal organisation, to be set apart, under the designation of

Improvement Commissioners and local board districts, to which were given similar powers and functions. So things went on, and perhaps it was still more characteristic of the state of things which occurred that every visitation of cholera was immediately followed by activity in the passing of fresh sanitary Acts. The visitation of cholera in 1832 stimulated sanitary legislation, with which the name of Chadwick was at that time eminently connected. Subsequent visitations in 1847 and 1854 were followed by further legislation, and after another outbreak Mr. (now Sir) John Simon was appointed to the position which he filled with so much distinction and advantage to the public, first of all as medical officer to the Privy Council, and after to the Local Government Board. In 1870 came the appointment of a Royal Commission, and from the report of that Commission, they might date all the subsequent improvements which had occurred. Royal Commissions in this country are often the means of starting legislation which is likely to be not particularly popular. In 1872 and 1874 the whole of the recommendations of this Commission were carried into effect, the most important of them being the appointment of a sanitary authority in every sanitary area throughout the kingdom, these sanitary areas being, in rural districts, those under the control of the guardians of the poor. In 1875, being then President of the Local Government Board, he (Lord Basing) was enabled to pass through Parliament a great Consolidation Act, the Public Health Act of 1875, which not only put together the provisions of between 20 and 30 existing statutes, but established what he believed was the most complete code of sanitary law which existed in the civilised world. The metropolis had been exempted from this statute, and it was only this year that the whole of the improvements effected over the country generally in 1875 had been satisfactorily established within the metropolis.

Lord Basing then referred to the excellent hygienic work done by the Local Government Board. He pointed out that we have in substance, though not in form, a ministry of public health, and he did not advocate the appointment of a separate minister. There were no doubt some defects in the existing system. One of these was the need for re-settling sanitary areas. The administration of the public health law had resulted in the short period of 20 years in the reduction of the annual death-rate of this kingdom by about one-seventh. There were now 1,569 sanitary authorities, of which 575 were rural and 994 were urban. As regards the rural authorities, there had been appointed 529 medical officers of health and 528 inspectors of nuisances; in the case of urban authorities 691 had medical officers of health, and 625 had inspectors of nuisance under public surveillance and control.

He apologized for referring so extensively to English legislation and practice, but he hoped he had shown that in sanitary affairs England had not been behind in the race. Through the medical department of the Local Government Board much information had been collected digested, and disseminated for the information of the public. No doubt from the official expert point of view all that had been accomplished in the matter of public health was trifling in comparison with what should



be done. They would desire, no doubt, more inspectors, more reports, more public expenditure, more clear recognition, and a more definite title than they had at present to the functions they discharged, and to the minister under whom they worked. But Parliament and the public would not readily accept such conditions as these without some demur. They would ask for what purpose had local areas and local authorities been set up if it was not to render them self-reliant and independent in the discharge of their duties, and for what purpose had information been collected at head quarters and disseminated if not for the training and guidance of local administration. This consideration led him to the practical question, What should they do now in the way of improvement? Should they endeavour to centralise more than had been done hitherto, or should they be content to see the administration of public health decentralised and carried on from local centres? A statesman was apt to compromise on matters of this kind. His view was that they had gained a great success by adopting the existing system of local administration. He doubted very much whether it would be expedient or desirable to separate the one from the other. That might be an ideal to be aimed at, but he did not at the moment see a sufficiently popular basis upon which that separation could be effected or attempted. On the question of decentralising and losing in any way the control which the Local Government Board now exercised over the administration of the Public Health Act, upon that again his contention was that, however plausible the cry for decentralisation might be, it should never be carelessly taken up as applicable to all subjects indiscriminately. When it is necessary to apply similar conditions to every district, State control is absolutely necessary and should be universally applied. He referred to the poor law in England, which would never have been so well administered had it not been under central control. He was not in favour of decentralising in an unreasonable way, and, referring to the county councils which had been recently established in this country, he thought the time had not yet arrived when it would be expedient for those councils to take over the powers now vested in a highly trained central department of the State. It had been said that nothing good was ever done in a hurry. We have progressed with the small means at our disposal. Far be it from him, however, to say that any ardent reformer should ever be content with what had been accomplished, or that the State should ever hold the doctrine of finality in this respect.

Lord Basing next referred to the efforts of other nations for improving the public health, specially mentioning Germany, France, and Denmark, and paying a compliment to the scientific investigators in France. In conclusion he expressed the hope that the work of the Section would do much to throw light on the position which the State should occupy in regard to sanitation in highly civilised countries.

Dr. Dudfield (London) proposed and Dr. Littlejohn (Edinburgh) seconded a vote of thanks to the President for his address. The vote was carried by acclamation.

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## The Formation and Organisation of Local Boards of Health.

BY

Dr. SIMON, Breslau.



The requirements of public health, as indicated by science, can be realised in two parallel ways :—

Firstly, by a wise legislation, based on known scientific results, creating such laws as will harmonize theory and practice ; secondly, by popular education of persons and communities as to the facts, interests, and duties required to promote the public health. Although these are parallel, both are essential, for of what benefit will be to the whole body the wisest provisions of sanitary law if the public mind is unable to understand and appreciate them ; if their application is hindered and frustrated, and the benefit intended is paralysed by the ignorance and passivity of the public ; and of what good is the highest enlightenment, of what avail are the best designed purposes, whether of the individual or of a community, if the State does not provide legal means by which those purposes can be regulated and executed ? It is therefore of eminent importance to provide adequate machinery for carrying out the provisions made by Government as well as to teach the public the tendency and appropriate application of the law. This machinery, which is to be interposed between the supreme government and the people, ought to be organised, self-dependent, and exclusive ; it ought to consist of institutions not connected with the supreme government. The execution and control of sanitary measures should not be given to any department upon which other duties already devolve ; for such measures cannot be properly executed or meet with public favour unless their administrative machinery rests on a self-dependent and professional basis, *e.g.*, on boards specially created. In suggesting the establishment of such boards of health, the example of England must necessarily recur to one's mind. There, on the foundation of advanced hygienic knowledge, a new political superstructure has taken form ; there, for the purpose of locally protecting the public health, "a great body of new law and a vast " apparatus of administrative machinery, wherein medical officers form " an essential part, have come into existence."\*

But of almost greater importance than the actual shape of English sanitary law, is the procedure by which that law is introduced. I refer particularly to the Royal Commission constituted in the year 1869, to inquire into the whole public sanitary regimen of England and Wales, which investigation produced rich and valuable material. Though this Commission aimed only at dealing with conditions specifically English, as its first object was to generalise for England the favourable results obtained in most large towns by sanitary reorganisation, yet it laid down direct fundamental principles useful for all states where sanitary legisla-

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\* Sir John Simon, Eng. Sanitary Inst., London, 1890, p. 463.

tion is not complete, or which are not beyond the initial stages of sanitary progress. The manifold experiences and judgments reported to that Commission by prominent medical officers, engineers, and administrators will continue to serve as a repertory, because they illustrate the great results already obtained, and bring to light the inconveniences and wrongs resulting from the want of obligatory legal procedure. The reports of the Commission \* were put within the reach of Germans in 1874 by the meritorious work of "Finkelnburg." † I would mention a few of the principal points as far as they touch my present subject: (1) The greatest possible simplicity and uniformity in the sanitary law which should apply generally and without optional restraints; (2) Constitution of popularly elected sanitary authorities as organs of urban and rural self-government; establishment of local boards of health under sanitary state-superintendence; (3) Appointment, if possible, of at least one medical officer of health in every district.

Since then 20 years of experience and further improvements have passed, marked especially by the great Health Acts of 1875 and 1878. The following ideas relative to the organisation of local boards of health, are based on the institutions existing in England, though I suggest extension of powers both on the professional and executive side.

I. In order to introduce and adopt the uniform measures required in the interest of public health, and to subject them to a continuous control, especially for the purpose of paralysing the effects of infectious diseases, local boards of health should be established, to which, amongst other functions, should belong the hygiene of dwellings, notification of infectious diseases, and disinfection of infected articles.

Good results can be expected only in places where such boards are permanently established; in many countries, sanitary commissions are appointed only in case of need; such commissions will in most cases be too late, and it is impossible for them to maintain an exact continuous study of local conditions in execution of the maxim "*Si vis pacem para bellum.*"

II. These central local boards should be subject, if possible, to the local authorities of self-government, and should report to them, but under State control. If the poverty of any community prevents the establishment of a local board, Government should furnish a subvention.

III. The head of the local board should be a physician, if possible, giving his whole time to this work. To him the technical staff, both in the internal and external service, should be subordinated.

Without denying that medical persons alone are not sufficient to fulfil all the requirements of the public health, and admitting that they depend on the co-operation of auxiliaries, both chemical and physical, as well as statistical and administrative, I attribute great importance to the chief director being a medical man, not only to give the board a medical

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\* First Report of the Royal Sanitary Commission, 1869. Second Report, 1871.

† Finkelnburg: Die öffentliche Gesundheitspflege Englands, Bonn, 1874.



stamp, but also to give it as free and independent an initiative as possible. Considering the great importance which all universities attach to the hygienic training of medical students, there will be no eventual want of appropriate material, especially if a sufficient salary is paid to the medical officer of health.

IV. In towns whose extent and population permit, only one local board of health should be established. In towns of more than 300,000 inhabitants, several boards with the same organisation might exist, but each should act under, and report to, a municipal chief board under similar medical direction.

V. In the formation of rural boards of health regard should be had to any suitable existing political territorial divisions (districts, parishes, &c.) and a uniform system of government should be observed. Such administrative districts may, according to the local conditions, contain 50,000 to 70,000 inhabitants.

VI. To discover localities where certain diseases are apt to prevail, the whole district should be divided into sub-districts of 20,000 to 30,000 inhabitants, each under a sanitary inspector. These should be further divided into sections of about 1,000 inhabitants, for each of which medical statistics should be separately compiled.

VII. The administration should be: A. internal, B. external; and the function of the board should be: *a.* arbitrary, *b.* controlling, *c.* executive, according to the way in which the following matters are dealt with by particular sections, viz.:—

(I.) A general section for works, canalisation, water-supply, and for settling building plans. (II.) A section for chemical inquiry into food and aliments, as well as objects of use, if possible joined with a bacteriological section, especially for examining disinfecting processes and controlling disinfection. (III.) A section dealing with notification and disinfection, as well as with the hygiene of dwellings and schools. (IV.) A section for statistics relating to hygiene and medicine.

VIII. The internal and external service of Section III. should be organised so as to enable mutual co-operation with the least loss of time. For this purpose—*a.* The duty of notifying certain diseases to be specified by Government should be obligatory; *b.* The expenses incurred in notifying by persons liable to notify should be repaid; *c.* The inspecting and executive officers should attend at stated hours at the office of the board to deal with notifications and to receive orders; *d.* Consistently with due regard to private interests, the entering of dwelling-houses should be made legal; and also *e.* The enforced removal to hospital of persons suffering from infectious disease, particularly if insufficiently isolated. *f.* Disinfection outside the house should be effected solely in the board's institute for disinfection, and the disinfection of houses and lodgings solely by appointed disinfectors; *g.* Disinfection at this institute should be available for all classes. No charge should be made for disinfecting dwellings of the poor below a certain rateable value.

Time does not permit me to enter upon all the last-mentioned points. I therefore limit my remarks to the compulsory removal of persons suffering from infectious diseases in cases of insufficient isolation. This will always be more or less a stumbling block, and will be dealt with differently in different countries according to popular enlightenment, and the temper and feeling of different peoples. While in Sweden, according to the law of 19th March, 1875, it is for the municipal commission of health to decide whether or not a person suffering from cholera asiatica, small-pox, scarlet fever, diphtheria, dysentery, abdominal typhus, or puerperal fever, shall be removed to a hospital; and while in Roumania an enactment is preparing by which the compulsory transport of sick persons suffering from the above stated diseases (besides measles, whooping cough, and canine madness) is absolutely prescribed for all cases that cannot be isolated in the dwellings, in Italy removal to hospital is not compulsory. "Our citizens," says Professor Celli, "would not allow such a violation of their individual liberty." England maintains a middle course. There, according to certain conditions, "any person who is suffering from any dangerous infectious disorder, and is without proper lodging or accommodation, or lodged in a room occupied by more than one family, or is on board any ship or vessel," may, by order of the authority, be removed to a hospital.\*

When this question is settled in the sense of my thesis, a mighty step will have been taken in opposing infectious diseases, and in strengthening the influence of local boards of health.

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DISCUSSION.

**Dr. Willoughby** (London) agreed with Dr. Simon's proposal, that public health laws should be administered by experts. This was done in America, but in England boards of health were composed of persons often ignorant of health principles, and sometimes interested in offending against them. The difficulty of carrying out the Rivers Pollution Act in Lancashire, and of improving the dwellings of the poor, arose from this cause.

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Sanitary Legislation in Ontario (Canada) for the Prevention of Epidemic, Endemic, Epizootic, and other Contagious Diseases.

BY

J. J. CASSIDY, M.D., Toronto.

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In this paper I shall first describe the provisions of the Ontario Health Act, by which the Provincial Board of Health of Ontario was established, together with the powers conferred on the board for the

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\* Sections 124, 125, Public Health Act, 1875.

prevention of contagious diseases ; and, secondly, I shall summarise the regulations which the Board has published and distributed through the municipalities in order to give effect to this legislation.

Prior to the year 1882, the municipal councils had the power, under chapter 190, R.S.O., to appoint health officers. In times of epidemics they availed themselves of this law, but in ordinary times they did not regard it. The effects of foul water, badly constructed and leaking house drains, damp, filthy cellars, and impure house air were but little inquired into. Disinfection, in the modern sense, was not carried out. Isolation was rarely practised even against small-pox. The vaccination of infants with humanised virus was pretty generally adhered to and performed, and this may account for the fact that small-pox was not as deadly in its ravages in Ontario as in other parts of the Dominion of Canada. Re-vaccination, except in times of epidemic, was rarely practised. As an illustration of how imperfectly municipal health work was performed at that period, it may be mentioned that during the years 1872, 1873, 1874, small-pox appeared in every county of Ontario, causing 371 deaths; while in 1883, 1884, 1885, it appeared in only 14 counties, causing 84 deaths. Such then were the conditions prior to 1882, when, after considerable discussion, "An Act to establish a Provincial Board of Health," was passed by the legislature.

In this Act certain much-needed clauses were enacted, providing for the isolation of cases of small-pox and the compulsory establishment of small-pox hospitals.

Clauses 3 and 4 thus define the powers given to the Provincial Board of Health :—

"The Provincial Board of Health shall take cognisance of the interests of life and health among the people of the province. They shall especially study the vital statistics of the province, and shall endeavour to make an intelligent and profitable use of the collected records of death and sickness among the people; they shall make sanitary investigations and inquiries respecting causes of disease, and especially epidemics, the causes of mortality and the effects of localities, employments, conditions, habits, and other circumstances upon the health of the people; they shall make such suggestions as to the prevention and introduction of contagious and infectious diseases as they shall deem most effective and proper, and as will prevent and limit, as far as possible, the rise and spread of disease, and they shall when required, or when they deem it best, advise officers of the government and Local Boards of Health in regard to the public health, and as to the means to be adopted to secure the same, and as to location, drainage, water supply, disposal of excreta, heating, and ventilation of any public institution or building.

"The Board shall from time to time, and especially during the prevalence in any part of the province, of epidemic, endemic, or contagious disease, make public distribution of such sanitary literature, and of special practical information relating to the prevention and spread of contagious and infectious diseases through the medium of the



public press, and by circular to the Local Boards of Health, municipal councils, and in and through the public schools, and otherwise as shall be deemed by them in the interest of the public health."

The powers of the Board were at that time of an advisory character. Unfortunately, however, this advisory feature had not proper scope, owing to the fact that very few municipalities had availed themselves of their powers to establish Local Boards. However, as a result of the investigations undertaken by committees of the Board into various epidemics in the province, owing also to the free circulation of sanitary literature, delivery of lectures, and publication of reports on health matters, together with the public interest excited by a sanitary convention held in London (Ontario), and more particularly by a persistent agitation in favour of the appointment of Local Boards by the councils, a considerable impetus was given to health work.

After two years' experience, however, it was felt that better local organisation was necessary. If executive work was to be carried on, it would be necessary to find a channel through which the provincial board could reach the people. The outcome of this thought was the Public Health Act of 1884, which makes it incumbent on all municipal councils to form Local Boards of Health each year immediately after the council themselves are elected, and by which all Boards possess the powers hitherto vested in the councils regarding health matters.

In four months after the passing of the Act, in the 447 townships of the province, 184 local boards were formed, 25 of these having medical health officers, and 19 of them sanitary inspectors, while 17 had appointed both medical health officers and sanitary inspectors. In the 203 cities, towns, and villages of Ontario, there were 180 local boards established, and of this number 63 had medical health officers, 92 had sanitary inspectors, and 44 had both medical health officers and sanitary inspectors.

Part Second of this Act, which deals with the powers and duties of Local Boards, is most important. When its provisions are properly carried out, local boards can, if composed of intelligent men, aided by a medical health officer and co-operated with by an appreciative council, grapple with contagious diseases in a most effective manner.

Provision is made by which the Local Board shall notify the owner of any premises requiring to be cleaned and disinfected; in case of non-compliance, a penalty is inflicted, and the work done by the local board at the expense of the owner. When the owner is poor or suffers from other disability, the expenses may be defrayed by the Local Board. Powers are given to local boards to establish hospitals, hospital tents, or places of reception for contagious diseases, and to provide carriages for the conveyance of persons suffering from such diseases to the hospital. Notice must be given to the Local Board of Health by householders in case of small-pox, scarlet fever, diphtheria, cholera, or typhoid fever, within twenty-four hours. Householders in whose dwellings any of the above-mentioned diseases occur shall not allow persons suffering from such diseases, or any clothing or other property to be removed without

the consent of the Local Board and medical health officer, or attending physician.

Physicians are obliged to report cases of the above-mentioned contagious diseases.

When any dangerous contagious disease breaks out in a municipality, the Local Board shall use all possible care to prevent the spreading of the contagion, and shall give notice of infected places.

Sick persons, or persons having access to them, are not allowed to mingle with the general public until permitted by the medical health officer.

If there is reason to suspect that any person has small-pox, diphtheria, scarlet fever, or other severe contagious disease in, or upon any steamboat, railway car, or other conveyance, the medical health officer, any member or officer of the Provincial Board of Health, or physician authorised by the Board, may cause the removal of such person and may detain the conveyance until it is disinfected.

Persons infected with contagious diseases, or who have been exposed to infection may be isolated.

Persons recovering from contagious diseases, and nurses who have been in attendance on them are not allowed to depart until their persons, clothing, and other property have been disinfected, and a certificate to that effect given by the medical health officer or attending physician.

The measures necessary for such disinfection, for the disinfection and disposal of excreta, for the disinfection of bedding, clothing, utensils, and other things, which have been exposed to infection are such as have been advised by the Provincial Board of Health, or the attending physician.

Notice is to be given to a person in charge of a conveyance by persons suffering from, or having very recently recovered from the above mentioned diseases. The owner of any such conveyance must not, after the entrance of any so infected person into his conveyance, allow any other person to enter it without having had it sufficiently disinfected. Precautions are also to be taken respecting the disinfection of bed clothing used by persons who have had contagious diseases. Local Boards may also provide a portable furnace for disinfecting purposes. They may also direct the destruction of any bedding, clothing, &c., and give compensation for the same.

Houses or rooms occupied by sick persons are to be disinfected before being let, and persons letting houses are not to make false statements respecting infectious diseases.

Penalties of from 5 to 50 dollars and costs may be imposed by the convicting magistrates or justices for violation of these enactments.

The Public Health Act of 1885 provided that whenever from the presence of any formidable contagious disease in any locality, the Provincial Board of Health considers the appointment of a medical health officer necessary in a municipality, and requests the council of the municipality to appoint one, the council shall forthwith appoint one. If a council does not appoint, the Lieutenant-Governor, upon the recom-

mentation of the Provincial Board, may appoint a medical health officer for such municipality. Provision is also made for compensation.

On account of the presence in any municipality of an epidemic or contagious disease, the municipal and school elections may be postponed.

Powers are also given for the purpose of disinfecting things or persons, entitling a Board or officer of a Board to employ force or obtain such assistance as is necessary. Section 3 of the Public Health Act of 1884 is amended, and full provision made for the inspection of railway stations, steamboats, and all public conveyances, their cleansing and disinfection, also for the detention of steamboats, railway cars, or anything contained thereon, or persons travelling thereby, and providing also for restraining the departure of persons and conveyances from infected localities, or the removal of persons living in infected localities, or for requiring the appointment of sanitary police.

The Public Health Amendment Act of 1886 provided for power to take possession of land or unoccupied buildings for hospital purposes, and also the proceedings to be taken whether the owner was a consenting party or not. In this year also, an Act was passed to amend the Act respecting vaccination. Provision is made in this Act by which a Local Board in case of neglect on the part of a council to provide for the vaccination of poor persons and others, may employ a physician to perform vaccination, and the council is obliged to pay for the same.

School trustees may also require certificates of vaccination from pupils. Students at high schools may also be required to produce certificates of vaccination.

In every municipality where small-pox exists or in which there is danger of its breaking out owing to the facility of communication with infected localities, the council may order vaccination and re-vaccination. Public notice is to be given by proclamation.

In 1887 an Act was passed providing that notification must be given by a householder to the school teacher of any school attended by children from his house, when a case of small-pox or other contagious disease appears in his house.

The Local Board are also obliged to give similar notice. The teacher is also obliged to notify the medical health officer on forms supplied by the school authorities, of any suspected case of contagious disease in the home of any pupil and he is required to prevent the attendance of such pupil until medical evidence of the falsity of the report has been obtained.

Local Boards have powers granted to regulate their ice supplies.

Remedies are also provided for tenants when Local Boards neglect to take action.

Provision is also made for the inspection of slaughter houses which are outside the municipality in which the meat is sold; also for the periodic inspection, by a veterinary surgeon, of all dairies, cheese-factories and creameries, dairy farms, and slaughter-houses, which come under the direction of a Local Board of Health.

In 1887 an Act was passed *re* school protection against infectious diseases, providing also for the regulation of ice supplies, for the in-



spection of slaughter-houses outside the municipality, as well as for the inspection of dairies.

It was found in practice that a serious defect existed in the legislation for 1887, which provides for inspection of cattle, from the fact that it is nowhere in the Act stated what diseases in cattle constituted unsoundness within the meaning of section 99 of the Public Health Act, by which power is given to a medical health officer or sanitary inspector to inspect and seize all unsound animals, meat, and milk in preparation for sale or exposed for sale. A short Bill was introduced in 1890 to explain the ambiguity referred to. It is intituled "An Act to amend the Public Health Act in respect to the sale of milk and meat from animals affected with tuberculosis." This Act provides, among other things, that upon any prosecution for keeping diseased animals, meat, or milk for sale as food, scientific examination may be made of the suspected meat or milk.

In the Public Health Act of 1891, actinomycosis, or clyers, was added to the list of diseases of animals, which, if found in cattle, will render the meat or milk unsuitable for food, and liable to seizure if exposed for sale.

In order to assist medical health officers, who for various reasons may not be in a position to do the work necessary to definitely settle whether the flesh or milk of a certain animal is or is not affected with tubercle or actinomycosis, the Ontario Government have established a chemical and bacteriological laboratory in connexion with the Provincial Board of Health where all such scientific work can be done.

The rules of our Board for the prevention of contagious or infectious diseases may be summarized as follows:—

Certain diseases are spread by means of minute living organisms transmitted directly or indirectly from person to person, and can be prevented if care and systematic means are taken to destroy these disease germs while yet limited to the sick-room.

The parts of the body which are the breeding places of the contagious organisms give them off in the greatest amount.

These parts are:—

In scarlet fever, the mouth, throat, nasal passages, and skin.

In diphtheria, mouth, throat, and nasal passages.

In small-pox, the pustules, chiefly of the skin.

In measles, the skin and air passages.

In whooping-cough, the air passages.

In typhoid fever and cholera, the discharges from the bowels.

The particles given off from the body and containing these organisms may pass into the air or find their way into water or food and so be introduced into the system by breathing, drinking, or eating, or through abraded surfaces. The first five diseases in the above enumeration are very commonly disseminated by means of the atmosphere. The special contagia of these five remain virulent for a great length of time and may be carried a considerable distance by the air without losing their activity. Typhoid and cholera while sometimes communicated by the air, are peculiarly liable to be transmitted by means of water. The



two last-named diseases as well as scarlet fever and diphtheria may be communicated by means of milk or other articles of food.

Under the head "Precautions to be taken by private individuals," the isolation of persons, especially children, who present suspicious symptoms, such as sore throat, discharges from the nose or eyes, bad breath, and fever, until the disease is diagnosed, is recommended.

Attention is drawn to the law of notification by householders and physicians.

The cleansing and disinfection of privy pits is enjoined. Mercuric chloride 1 in 500 is recommended. Whatever garbage is capable of being burned should be so treated, and all that cannot be so dealt with should be frequently removed. Care in the matter of water supply is enjoined. Frequent analysis is recommended. If filters be in use they should be cleansed and the filtering material renewed.

Supervision of the ice and milk supply are enjoined. Special regulations are made with regard to food in time of cholera. Special attention is also given to the matter of disinfecting stools in typhoid fever and cholera.

The proper trapping and ventilation of waste pipes and all connexions of house drains and flushing of sewers are also described. Rules are given by which people may avoid exposure to the poisons from the sick, from vehicles in which they may have been carried, the clothes they may have worn during sickness or convalescence, or the articles of table equipage they may have used.

The disinfection of bedding, clothing, mattresses, carpets, curtains, &c., is enjoined, and people are advised not to purchase such at second hand unless they have been properly disinfected.

Respecting the sick room, it should be preferably in an upper story if there is more than one storey. There should be an air-space of 1,000 cubic feet for each individual. Ventilation should be provided for, fire-places or flues being used when practicable. Needless articles should be removed. Inexpensive bedding should be used and destroyed on the termination of the case; but if feather beds, feather pillows, &c., are used they should be subsequently disinfected with chlorine, sulphur, or intense heat. Disinfectants should be used in the bed-pan and the excreta buried, so as not to contaminate the water supply. In sewered towns they may be discharged into the sewers. Soiled clothing and bedding should be steeped for 24 hours in a tub containing a suitable disinfectant (1 in 2000 mercuric chloride), then boiled and rinsed in clear water. Clothing which has not been soiled may be treated by heat. The sweepings of the room should be burned.

Nurses and attendants in addition to keeping themselves and sick charges clean are advised to wear cotton or linen clothes or overalls. When convalescence has begun, the patient should after bathing and putting on clean clothes, be placed in a room distant from the sick room before joining the other members of the household. In no case of death from contagious disease should a public funeral be held; but the body should be buried without delay and as few persons as possible should

attend. In cases of deaths from small-pox, scarlet fever, diphtheria, and cholera, the body should be enveloped in a sheet thoroughly saturated with mercuric chloride 1 in 500, and the coffin should be filled up with sawdust, moistened with the same solution.

After the termination of the case, the room and its contents should be disinfected. When occupied, it should be washed with a solution of mercuric chloride 1 in 1000; when vacated it should be fumigated with sulphur for 12 hours, burning three pounds of sulphur for every 1,000 cubic feet of air space in the room; all surfaces should then be washed with the mercuric chloride solution, and afterwards with soap and hot water, finally doors and windows should be opened and the room ventilated freely.

The duties of municipal authorities are also described, but these have already been referred to under the various Public Health Acts of 1884, 1885, 1886.

The pamphlet concludes with a description of hospitals used in connexion with the Cantonal Hospital at Geneva, and adapted to the isolation and treatment of cholera, scarlet fever, small-pox, diphtheria, &c. This is an extract from a paper read by Dr. Jullard at the International Congress of Geneva, 1882.

Our present degree of organisation in health matters in Ontario is as follows:—

1. Provincial Board of Health, consisting of seven members, all physicians. The Board meets quarterly, and has certain powers which have been described in the first part of this paper. It has a chemical and bacteriological laboratory.
2. Five hundred and seventy-six local Boards.
3. Three hundred and fifty-six of these have medical health officers.

The following table shows the mortality in an urban population of 355,931 in Ontario for 1889 from small-pox, scarlet fever, measles, diphtheria, typhoid fever, and phthisis:—

Small-pox	-	-	-	No deaths.
Scarlet fever	-	-	-	27
Measles	-	-	-	16
Typhoid fever	-	-	-	148
Diphtheria	-	-	-	207
Phthisis	-	-	-	678

Our Board is at present engaged in preparing a pamphlet, setting forth the best means of preventing the dissemination of phthisis among the people.

The Vaccination Act provides for compulsory vaccination of infants, but in practice it is not enforced, except in times of epidemic. The percentage of unvaccinated persons is however small. A vaccine farm is in operation at Palmerston, subject to the inspection of the Provincial Board. A constant supply of good bovine lymph can always be obtained from this establishment. Most vaccinations are done with bovine lymph, the humanised article being but little used. Opposition to vaccination is confined to a few, and those of but little influence.



## DISCUSSION.

**Dr. Covernton** (Canada) urged the necessity of having stringent regulations in dealing with infectious diseases. During the small-pox epidemic of 1885 in Montreal (Province of Quebec) hundreds of deaths occurred daily. The Montreal Local Board of Health then only possessed advisory powers. The Government of the Province of Ontario sent a delegate to Montreal to ascertain the measures taken. He, with delegates from three bordering American States, met the Montreal board, and learnt that they had used their limited powers well, but that these did not enable them to effectually cope with the disease. After consultation with the delegates, the Montreal board obtained full executive powers from the Government, and beneficial results quickly followed. In the interval seven Toronto medical men were sent to Montreal. One remained there to watch every package of goods leaving for Ontario, and to ascertain whether it had come from an infected locality; one travelled on every train from Montreal to Ontario and offered re-vaccination to every passenger who had not been vaccinated for seven years; those who refused were prevented from entering Ontario. There are now in the Province of Quebec numerous medical health officers, and existing regulations in that province are as stringent as those in Ontario or in the American States.

**Dr. Craik** (Canada) said that prior to 1885 nothing was known of public hygiene in the Province of Quebec. The good work done by the Central Board during the small-pox epidemic of that year resulted in the establishment in 1887 of the present provincial board. Since 1887, 314 local boards had been organised in the most important towns of the province. The public appreciate the work of the provincial board. Under a recent statute, regulations had been issued that would bring the sanitary law of the province up to a high level of perfection.

**Dr. Prince** (Boston, U.S.A.) stated that in Massachusetts the system of health boards was essentially the same as in Ontario. Some years ago the Boston board decided to quarantine or remove to hospital every case of small-pox. This, and other measures, practically stamped out small-pox from the city. About a year ago that board decided to take similar steps in regard to scarlet fever and diphtheria. Difficulty had arisen from the want of sufficiently early notification, and from lack of facilities for caring for the sound members of the family where the persons are poor. To properly quarantine the sick a hospital was wanted that would take both sick and healthy. Thus, if a child were ill, the mother should be received, and sometimes her other children also.

**Dr. Whitaker** (Belfast) referred to the difficulty of disinfecting houses where infectious disease had appeared, and in which persons still lived. Harm might be done to the latter by indiscriminate or excessive use of disinfectants. He also referred to the difficulty of procuring the removal of better class patients to hospital. Belfast had no system of notification, and no special hospital for infectious diseases. Cases had, however, been successfully treated in the workhouse hospital.

**Councillor Coe** (Halifax) desired that school authorities and teachers should be compelled to notify to sanitary authorities the existence of disease at the homes of children, as in America. Very much depended on promptitude of notification and efficiency of isolation.

**Councillor Biggs** (Leicester) deprecated the tendency to ask for more compulsory powers. Although Leicester had not, like Toronto,



enforced vaccination regulations, no deaths from small-pox had occurred in Leicester during the last eight years, although cases had often been imported. Extreme measures like those in force in Canada would be resisted here, though all classes were willing to submit to well considered regulations which did not trench on personal liberty. In Leicester, people had voluntarily gone into quarantine, and enabled the sanitary authority to stamp out small-pox without vaccination by applying sanitary measures and isolation.

**Dr. Cassidy** (Canada), in reply to questions, said that physicians in Ontario were not required by law to disinfect themselves; that under the Ontario Public Health Act infectious disease must be notified within 24 hours; and that according to the medical opinion of the age safety against small-pox depended on vaccination, isolation, and disinfection.

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### Results of Ten Years' Public Sanitary Work in Dublin.

BY

SIR CHARLES A. CAMERON,  
 Ex-President and Professor of Hygiene and Chemistry, R.C.S.I.,  
 President of the British Public Health Medical Society,  
 Superintendent Medical and Executive Officer  
 of Health, and Public Analyst for Dublin,  
 &c., &c.

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The population of the Dublin registration area amounted, according to the census of April, 1891, to 357,050 (unrevised figures), and of the city or central portions to 254,709. The population in the whole area was at the rate of 14·8 persons per acre, and in the city 66·2. The birth-rate is about 29 per 1,000 of the population. The mean temperature at the Ordnance Survey Office, Phoenix Park, for the 10 years ended in 1890 was 48·3; it is slightly greater in the city. The population of Dublin city increased 2 per cent. between 1881 and 1891, whilst in the whole area the increase was 3·5 per cent. In the Dublin Metropolitan Police District—population in 1891, 369,891—the males numbered 169,203, and the females, 192,688.

Dublin is situated on both sides of the river Liffey, and its suburbs spread round the Bay of Dublin. It is well supplied with main sewers, the contents of which are discharged into the river. A large portion of the city lies so low that the floors of basement stories are below high-water level, consequently, the sewers cannot continuously discharge their contents into the river. The mouths of the sewers are provided with valves which open outwards, and which are closed when the water in the river rises to the level of the sewer mouth. The sewers situated near the mouth of the river are often sealed during the greater part of the twenty-four hours. In order to prevent their contents from becoming impounded to such an extent as to prevent the drainage from the houses entering the sewers, powerful steam pumps are employed to

lift the surplus sewage to a level above high-water. It will therefore be seen that Dublin is unfavourably placed with respect to its sewage, which is retained for a long time in the sewers, and which, when discharged into the river, constitutes a nuisance therein, which, especially in warm weather, is greatly complained of. At the present time the Municipal Council is seriously considering the question of main drainage. At no distant date we may expect to see the Dublin sewage either conveyed to a distant point and discharged into the open sea, or subjected to some precipitation process; on economic grounds, I prefer the latter method.

Another disadvantage under which Dublin suffers is the decayed condition of a large proportion of the tenement houses. There are about 54,000 families in Dublin, inhabiting about 24,000 houses; 32,000 families occupy 8,000 houses, and 22,000, the remaining houses. The 32,000 families have  $1\frac{1}{2}$  rooms on the average per family. The tenement houses were for the most part originally built each for a single family, and many of them now accommodate from 4 to 10 families. These houses, it need hardly be said, are ill adapted for the accommodation of several families, and many of them are so old that it is almost impossible to keep them in proper repair.

Late in 1879, I became the chief Medical Officer of Health for Dublin, and soon after the whole Sanitary Department of the Municipality was placed in my charge; I was appointed the "Executive," as well as the "Medical," Officer of Health, and the power of appointing and dismissing the sanitary officers was given to me.

In 1879, the death-rate in the Dublin metropolitan area (city and suburbs), was 35·7 per 1,000 persons living; and in 1880, it was 35·9 per 1,000. In 1879, the death-rate in the city of Dublin was 37·5; and in 1880 it was 37·8 per 1,000. In 1879 the death-rate caused by the principal zymotic diseases was 5·6 per 1,000 persons living in the whole metropolitan area, and 6·2 in the city. In 1880 the rate was 7·2 in the whole area, and 7·9 in the city.

This was the terrible state of things existing in Dublin when I became the chief health officer. The measures which I proposed should be taken to improve the sanitary state of Dublin, were chiefly as follows:—1. To provide better dwellings for the very poorest classes of the community. 2. To de-tenant and close the tenement houses which were most unfit for human habitation. 3. To compel the owners of tenement houses to keep them in tenantable order. 4. To cleanse daily by Corporation workmen, the yards of the tenement houses and their sanitary accommodation. 5. To abolish the privies and ashpits in connexion with houses, tenement or private, and to substitute therefor water-closets and portable ash-bins.

I shall now briefly state how far my suggestions have been acted upon, and the results.

1. The Corporation of Dublin, on consideration of my report recommending the adoption of the provisions of the *Labouring Classes' Dwellings Acts*, resolved in 1881 to accede to my request. In 1888,

two blocks of artisans' dwellings and a nightly lodging-house were erected by the Corporation on a portion of their own estate situated in Barrack-street; they comprise 144 separate dwellings and 100 beds for nightly lodgers. The dwellings are rented from 1s. 6d. to 5s. per week. There are five shops which bring higher rents. This scheme cost 27,500*l.*; it has not been successful from a pecuniary point of view. In 1890, two-story houses were erected in Bow Lane on a site owned by the Corporation; they comprise 86 self-contained dwellings. Each house contains four distinct tenements: two upon the ground floor and two upon the first floor. The dwellings are built side by side in a continuous row, on each side of a new street, running north and south, thus giving the dwellings east and west aspects. Each tenement consists of a living room 12' 8"  $\times$  12' 0"; one bedroom, 10' 6"  $\times$  7' 6"; also a convenient sized scullery and a separate water-closet, all 8' 3" high. The weekly rent of this tenement on the upper floor is 2s. One of the two tenements on the upper floor contains a bed recess over the bottom flight of stairs, affording accommodation for two children or one adult, in addition to the bedroom accommodation. For this tenement 2s. 6d. is charged. On the ground floor the tenements are similar, but possess large gardens. The rent for the tenement on the ground floor, without the bed recess, but including garden (which is much appreciated), is 3s., and for the tenement containing the bed recess under the upper flight of stairs, 3s. 6d. It will be observed that the arrangement of the tenements is such, that in the event of the family including grown-up children, two tenements, possessing very ample accommodation and conveniences, with separate water-closets, &c., for the sexes, can be obtained at the rent of 4s. 6d. for the two upper tenements; or that one ground floor tenement with garden, and one first floor tenement can be obtained for 5s. A complete and perfect system of ventilation is provided by means of upcast and downcast flues to each room, the inlets and outlets of which are so placed as to prevent draughts, and a constant change of air is ensured, although the doors and windows may be closed. The living room is provided with a cottage range and an enclosed cupboard, and the scullery has an earthenware sink supplied with cold water, also a coal-box adjoining the sink, and a meat-safe over the window; the latter being in three heights; the upper portion of the window and side panels of the safe are filled in with perforated zinc. The windows of the living rooms are 4 ft. wide, and extend up to the ceiling, thus causing the rooms to be both light and cheerful. The windows of bedrooms and of the scullery are also carried up to the ceiling. The buildings are all of concrete and are fire-proof throughout, the upper floors being also constructed of concrete on iron joists. The roof is flat, similarly constructed, and covered with two thicknesses of asphalte; and the whole area under the rooms on the ground floor is covered with broken stones, concrete, and a layer of pitch and tar,  $\frac{1}{2}$  in. thick, to ensure absolute dryness. The landings and staircases are of concrete, covered with asphalte, and the floors of sculleries and water-closets are of concrete. The whole scheme consists of 86 of these self-contained dwellings, some of them with



shops, and others with additional rooms, for which an increased rent is charged according to accommodation. Applications largely in excess of the number of tenements to be let were received before the dwellings were completed. Every tenement is occupied, and no rent is in arrear, or has been lost since the dwellings were opened, and a large number of applicants are now on the books seeking vacancies as they occur. The dwellings were erected for the accommodation of labourers, but widows and single women (seamstresses and others) are also received as tenants. Mr. Dudgeon was the architect, and consulted with me as to details of the dwellings. The Dublin Artisans' Dwellings Company have provided healthy dwellings for nearly 10,000 persons, and about 1,000 persons are provided for by the City and Suburban Workman's Dwellings Company. Messrs. Guinness, Sons & Co., brewers, have provided dwellings for a large number of their workmen, and so have some other employers of labour. Altogether good dwellings have been lately erected capable of accommodating about 15,000 persons. It would, however, be desirable to provide improved dwellings for at least 50,000 persons.

2. From 31st August, 1879, up to 31st December, 1890, 2,556 insanitary houses have been detenanted and closed. More than one-half have been completely removed, and the others have been extensively repaired and rendered habitable. The houses that have been completely taken down have in a large number of cases not been replaced by new ones, as they were situated in close alleys and courts, or in other situations in which it was undesirable to build houses. Seven hundred and fifty-eight cellar and kitchen dwellings have been closed since 1879, as have also several hundred rooms in houses, portions of which were fit for occupation. In one district—Wood Street, Arthur's Lane, and Oliver's Alley—an area of more than one acre was cleared without any expense to the city in the way of compensation to the owners of the houses. All the houses were detenanted under the provisions of the Public Health Acts (Ireland), 1874 and 1878, and when they became ruinous, they were pulled down. Clearances of a similar kind have been made in Bull Lane, Kennedy's and Ross Lanes, and in other localities. In addition to the above-described clearances, two unhealthy sites were cleared under Cross's Act. They embraced an area of 7 acres 3 roods and 13 perches, upon which some of the most insanitary dwellings in Dublin were situated. The cost amounted to 51,500*l.*, or at the rate of 5,971*l.* per acre. The houses cleared away numbered 361, and were inhabited by 2,603 persons. The cleared sites were let by the Corporation to the Artisans' Dwellings Company, at the rent of 390*l.* per annum, and they are now covered with Artisans' and Labourers' Dwellings. Some very unhealthy dwellings were got rid of at my suggestion by making a new street (St. Augustine Street), at a cost of 8,000*l.* Very bad dwellings were also got rid of within the last 10 years by making two new streets (Lord Edward Street and Tara Street), but these improvements were not undertaken at my suggestion. The money expended in clearing the Coombe and Plunkett Street areas, and providing dwellings for the working classes amounted to 92,025*l.*



3. A vigorous inspection of tenement houses has been maintained since 1879, with the result that their condition has been materially improved. In the inspectorial work, 23 officers are employed under my directions.

4. In Dublin, the ashpits and privies of private houses are cleansed by the Corporation. Finding that it was very difficult, and indeed impossible, to get the owners of the tenement houses to keep the yards, privies, and water-closets clean, I induced the Corporation to undertake this duty. It is now carried out at an annual cost of about 3,000*l*. This system has been, I believe, an important factor in improving the health of Dublin.

5. Before 1880, water-closets were unknown in the tenement houses; some of them had no sanitary accommodation at all, whilst in many cases the privies were placed against the back walls of the houses, and they communicated directly with the large and uncovered ashpits. The contents of the latter were, especially in wet weather, more or less liquid. The proximity of these ill-kept and rarely cleansed privies and ashpits to the tenement houses produced, I am satisfied, great injury to health. I commenced at once an attack upon the privies, and in 1880, 743 waterclosets were substituted for them, nearly all in tenement houses. In 1881,\* 603 waterclosets were substituted for privies. In 1882 I had a survey made, which showed that in all Dublin (City) there were 15,531 waterclosets and 11,269 privies. About this time I reported strongly in favour of providing portable bins for the reception of house refuse, and since then every effort has been made to abolish the built ashpits and to substitute for them portable bins. At the close of 1890 there were 10,752 Corporation dustbins in use. Very few privies now remain, and in Dublin the water-carriage system of excreta has almost completely been established. Amongst the sanitary measures taken for improving the health of Dublin, I may mention the thorough and gratuitous disinfection of infected dwellings, clothes, and bedding. Infected beds are burned, and new ones given gratuitously in lieu of them. Disinfectants are given free to the working classes. A laundry for infected linen has been established; public baths and wash-houses have been provided in Tara Street; a public abattoir has been established, which, however, has not as yet been largely used; the inspection of dairies and cow-sheds is carried out by four inspectors; the Act for the compulsory notification of infective diseases has been adopted. Within the last 10 years 54,000*l*. has been expended in providing new sewers and machinery for pumping out their surplus sewage. Two open spaces for recreation have been provided by the Corporation at a cost of more than 2,000*l*.; and contributions amounting to 104*l*. a year are made towards maintaining two open spaces which are not directly under the control of the Corporation. If we regard the improved paving of the streets as a measure likely to promote public health, then the money expended in that work (225,706*l*.), in new sewers

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\* In 1884, 2,789 waterclosets were substituted for privies as a result of proceedings by the sanitary staff.

(53,107*l.*), and in carrying out the improvements above referred to and some minor ones, amounts to 607,603*l.* 1*s.* 7*d.* This large sum has been obtained as "sanitary loans" since 1880. There is still much to be done before the city can be regarded as incapable of further improvement by Corporation action. The private slaughter-houses should be abolished. Dairy-yards should be got rid of. Every remaining privy and built ashpit should be wiped out. A main drainage system should be carried out. At least 7,000 more dwellings should be provided for the working classes.

Now, let us see whether or not the expenditure of 607,000*l.*, and of 10 years' sanitary labour, have resulted in any substantial improvement of the public health in Dublin. It is well known that sanitary reforms do not generally bear immediate fruit. It is, therefore, only towards the close of the decennial period of sanitary work in Dublin that we might expect to find a diminution in the enormous death-rate of Dublin. The average death-rate in the Dublin metropolitan area during the period 1876-80 was 31·76 per 1,000 persons living. In the city the rate was 34·11 per 1,000, and in the suburbs, 23·39. During the period 1881-85, the death-rate in the whole registration area was 27·32, in the city 30·34, and in the suburbs 19·68. In the period 1886-90, the death-rate in the whole area was 26·3, in the city 28·86, and in the suburbs 19·86. In the period 1876-80, the death-rate from the principal zymotic diseases in the whole registration area was 5·29 per 1,000 persons living; the rate in the city being 5·83, and in the suburbs 3·27. In the next quinquennial period, 1881-86, the rate in the whole area was 3·06, in the city 3·42, and in the suburbs 2·16. During the period 1886-90, the rate in the whole area was 2·86, in the city 3·2, and in the suburbs 2·02. Before the year 1879, 10 per cent. of the deaths were unregistered. In that year, owing to recent legislation, perfect registration first commenced, and the burials no longer exceeded by 10 per cent. the registered deaths, as was the case until early in 1879. I have, therefore, added 10 per cent. to the recorded death-rate for 1876-77-78. The causes of a high death-rate in communities may be nearly altogether capable of removal by the sanitary authority, or they may only to a moderate extent be of such a nature as to admit of removal by the sanitary authority. Poverty and intemperance are two potent factors in causing a high death-rate, and they are hardly under any control by the local authorities. The proportion of very poor persons in Dublin seem to me to be somewhat greater than in most of the English cities—certainly greater than in London. In all cities, it is undoubtedly the case that there is a greater mortality amongst the poor than amongst the middle and upper classes. It is not in the power of the Corporation of Dublin to provide employment and good wages for the masses of the population, and consequently constitutional and other diseases as affecting the poorer classes, are beyond Corporation influence. The effects of public hygiene are, however, felt in respect to zymotic diseases by all classes. I think I shall show that the 10 years' sanitary work in Dublin has apparently greatly reduced the zymotic death-rate, though it may not have very largely lowered the general death-rate. The general death-rate declined

in the period 1881-85, as compared with the previous quinquennial period, to the extent of 13·98 per cent. in whole area, 11·05 per cent. in the city, and 15·86 per cent. in the suburbs. In the following five years the death-rate decreased 3·73 per cent. in the whole area, 4·88 per cent. in the city, and increased 0·91 per cent. in the suburbs. The death-rate from the principal zymotic diseases decreased during the period 1881-85, as compared with the previous five years, 42·16 per cent. in the whole area, 41·34 per cent. in the city, and 33·39 per cent. in the suburbs. In the following five years the decrease was 6·44 per cent. in the whole area, 6·43 per cent. in the city, and 6·48 per cent. in the suburbs. As compared with 1876-80, the death-rate decreased in 1881-90, 15·59 per cent. in the whole area, 13·22 per cent. in the city, and 15·48 per cent. in the suburbs; and the zymotic death-rate decreased 44·05 per cent. in the whole area, 42·23 per cent. in the city, and 36·09 per cent. in the suburbs. The relation between the decrease in the mortality of the whole area, and that of the city and suburbs in 1880-85 is affected by the circumstance that, in 1881, four large and almost wholly rural districts were added to the Dublin Metropolitan Registration area. In the new districts the general and zymotic death-rates have been, and are still, lower than in the four suburbs which always formed part of the Dublin Metropolitan Registration area. The improvement of the public health in the city of Dublin has a good effect upon that of the suburbs, as a large proportion of the inhabitants of the suburbs are engaged in business in the city all day, and are subject to a large extent to whatever insanitary influences there may be in operation in the city. In 1891 the improvement in the state of the public health of Dublin continues. During the first 30 weeks of the year the death-rate was 2·8 per 1,000 persons living under the mean rate for the corresponding period in the previous 10 years. The most remarkable feature in this year's mortality statistics is the close approximation of the zymotic death-rate in city and suburbs; indeed, in the first quarter of the year the zymotic death-rate was only 1 per 1,000 in the city, whilst it was 1·2 per 1,000 in the suburbs. With respect to the particular zymotic diseases, which have declined in Dublin within recent years, special reference must be made to typhus fever. This disease formerly caused terrible ravages in Dublin, but lately it has almost completely disappeared. On the other hand, typhoid fever has not decreased at all. Very few cases of diphtheria occur in Dublin. In 1890, the deaths in the city of Dublin per 10,000 persons attributed to typhoid fever were 49; to typhus fever, ·07; to diarrhoea and dysentery, 59; to whooping cough, 59; to scarlet fever, 2; to measles, 26; to diphtheria, 0·9. Small-pox has long been extinct in Dublin. A few years ago, Dublin had a much higher death-rate than any of the large English towns; lately, several English towns exceed it in mortality. With respect to its zymotic death-rate, Dublin now compares very favourably with the English towns. In conclusion, I may state that the population of Dublin has been slightly under-estimated since 1881, hence its death-rate has been slightly exaggerated; on the other hand, the population of the English towns has been (on the whole), enormously



over-estimated, and, consequently, their death-rate under-stated. For example, if we correct the death-rates of Liverpool, Manchester, and Bolton for the period 1881-90, by the results of the census of 1891, the rates will be—Liverpool, 26·3 per 1,000; Manchester, 26·6; and Bolton, 26·5. In the period 1886-90, the mean annual death-rate in Dublin was 26·3.

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DISCUSSION.

**Dr. T. W. Grimshaw** (Registrar-General for Ireland) estimated from the Irish Census Returns that in 1871 about 100,000 out of the 250,000 inhabitants of Dublin lived in tenement houses unfit for habitation. This was a great difficulty to overcome. When he became physician to Cork Street Fever Hospital in 1861 a large number of the beds were always occupied; but for a long time past the average number has been very low. The money expended by the Dublin Corporation for clearing unhealthy sites is not all lost; increased municipal rates are received from houses of higher value built on the sites, poor rates have diminished, and sanitary rates are lower. The Corporation have liberally aided the work of Sir C. Cameron, and from Dublin many valuable sanitary lessons can be learned.

**Dr. Whitaker** (Belfast) objected to corporations undertaking house-building; their duty should be limited to strict supervision. He approved of their providing for back-yard cleansing; thought that the Dublin sewage should not flow into the river Liffey, and spoke of the advantages arising from "provisional orders" as a means of conferring on corporations powers to carry out improvements.

**Sir John Banks** (Dublin) said that the improved sanitary condition of Dublin was shown by the diminution of typhus fever, which formerly there found a home, but was now rarely seen. He referred the improvement to the work of Sir C. Cameron.

**Sir C. Cameron**, in his reply, stated that the demolition of houses in Dublin was mostly effected under the Public Health Act, in which case the sanitary authority incurred no cost. He thought the municipality should not erect houses for the better class of citizens, but they might usefully do so for the very poor.

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Should the State undertake Scientific Investigations into the  
Origin and Causes of Disease.

BY

HY. TOMKINS, M.D., B.Sc., Medical Officer of Health for Leicester.

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Everyone engaged in public health work must have often felt the limitation of our knowledge in regard to the causes, etiology, and favouring circumstances connected with the prevalence of certain diseases, and our professional brethren who are more concerned in the treatment and cure of disease must feel still more the need of expert

training to deal with problems which often demand constant prolonged scientific study, observation, and experiments.

The desirability of the State undertaking many of the investigations into the causation of disease first impressed itself prominently upon my mind during some efforts of my own to trace to its origin and cause the undue annual mortality from diarrhœa at Leicester. In many instances it is simply impossible for any unaided private individual to obtain all the detailed information, extending often over the length and breadth of the land, connected with obscure problems of disease causation, or to compare, accurately and scientifically, conditions existing in one district with those in another or others, though they may be of the utmost importance to enable us to arrive at any approximately accurate conclusions.

The need for State help in such inquiries has practically been admitted by the Government in the establishment of a medical department at the Local Government Board, not the least important of whose functions has of late years been the investigation of outbreaks of epidemic disease. These investigations, all bearing upon the causation and prevention of diseases, not necessarily infectious, have been carried on by skilled experts, physicians, chemists, bacteriologists, physiologists, and others, chosen for their special knowledge in some particular branch of science, many of them not being members of the permanent medical staff of the department.

Amongst these may be cited—

Work carried on by Dr. Klein in connexion with tuberculous disease in its various phases; diphtheria; etiology of croupous pneumonia; scarlet fever, &c.

Dr. Burdon Sanderson on disinfection, &c.; Dr. Cash on disinfection and on ptomaines found in secretions and excretions of the body; Mr. Law's work connected with disinfectants. Life conditions of anthrax bacillus, &c.

Dr. Du Pré:—Changes in aëration of water.

Dr. Woolridge:—Mode of action of pathogenic organisms.

Dr. Longstaff:—Diphtheria.

The work, too, of members of the permanent staff is often of a strictly scientific character, such as the investigations carried on by Dr. Ballard into causes of diarrhœa;

By Dr. Parsons, upon best methods of disinfection;

By Mr. Power upon disease in cows, and scarlet fever; together with much other of a like nature.

Good work has already been done, but much more remains to be accomplished; the field is immense; to mention only a few of those diseases which at the present time call for special inquiry into their causes, their mode of origin, and the conditions favourable for their production, we may cite—

(1.) Cancer in its different forms, with its marked increase of late years, and its apparent special incidence upon certain districts and localities.

(2.) Diphtheria, with its increased prevalence during the past decade amongst many of our large urban populations. Formerly this disease was most prevalent and fatal in the rural districts of the country; why the change? Never before was sanitation (speaking generally) carried on more rigorously, at all events in our large towns, and yet it is here that this disease appears to be making most headway. It is impossible, in the inquiries necessary to be undertaken in connexion with investigations into either of these diseases, for any single and isolated observer to do more than touch the fringe of the subject.

(3.) The causes and etiology of diarrhœa, producing annually an enormous mortality, are still largely matter of speculation. Dr. Ballard in his elaborate report published in 1889, the result of some years study of the subject, says that his conclusions are to be taken only "as a working hypothesis or provisional explanation that would best accord with the production of epidemic diarrhœa." I myself have worked at this subject pretty exhaustively, and probably from a bacteriological standpoint as fully as any observer up to the present time, but my observations have been confined to Leicester, and I feel the need for a more extensive investigation carried on in the same way in other places, both where the disease prevails and where it is comparatively absent.

(4.) The etiology and transmission of tuberculosis, especially its connexion or otherwise with the same disease in the lower animals, is a subject worthy the assistance of all governments. Much has been, and is being done, by private enterprise and by State aid in other countries; our own government should help. The importance of it has been recognized by the appointment of a Royal Commission to inquire how far our knowledge in this direction extends.

(5.) Investigation into the causes and origin of epidemic pneumonia, an outbreak of which at Middlesboro' was the subject of inquiry by one of the staff of the Local Government Board.

(6.) The study of the recent outbreak of influenza (if the now familiar neurotic-febrile disease be thus rightly termed), which has also been the subject of inquiry and report by another member of the same staff. These and many other diseases and conditions which conduce to disease are worthy of State help in their investigation.

Look at the enormous ground covered by the practical study of bacteriology and its intimate relation with so many of the processes of health as well as disease. Thanks to the efforts of private individuals considerable progress has been made in this branch of study, but it is often in the face of much difficulty, and in no case is work of this kind remunerative from a pecuniary standpoint. The knowledge required of those who undertake such work is of a special and varied character, and at present the number of men properly qualified or capable of carrying it on is not large—the more reason why the State should come forward with assistance. A few semi-public bodies have at times contributed by grants or special contributions to help forward scientific work in connexion with disease, *e.g.*, the Grocer's Company and the British Medical Association. But I submit that the government of a country is the proper source from which material assistance should be forth-



coming for the furtherance of work having for its sole object] benefits to the health of the community at large. By a private individual, however able, dependent upon his own exertions for his maintenance, work of this character cannot be followed as a life's occupation, and many men very capable of doing good service are prevented by lack of means. The State should, therefore, provide adequate emoluments and encouragement to men willing to devote themselves to this work.

England compares unfavourably in this respect with some continental countries.

Our Government does not hesitate to maintain at considerable cost chemists and other scientific men to devote their whole time to work which has for its ultimate object the improvement of the art of killing and slaying, and provides splendidly equipped laboratories at Woolwich for experimental studies connected with war, whilst on the other hand it is most niggardly in its dealing with matters which are vitally connected with the health and well-being of every member of the community.

I shall not now attempt to deal with the ways and means by which these proposals might be carried out. An ideal arrangement would be the establishment of a Government Department, with a Minister of Public Health at its head, but in default of this surely something might be easily gained by extending the work done by the Local Government Board. Briefly, the medical department of that Board should be empowered to do thoroughly and systematically that which it now does incompletely and in a somewhat hap-hazard manner.

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### Should the State undertake the Support of Laboratories for the Investigation of Disease?

BY

A. E. WRIGHT, B.A. Cantab., M.D. Dublin.

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Political aspect of the matter depends upon which of the following alternative standpoints is adopted:—

- (a.) The State shall undertake every function that can be advantageously undertaken by it.
- (b.) The State shall undertake only such functions as it cannot without detriment to itself refuse to undertake.

It is proposed to discuss the matter from this last standpoint, because it is the more generally accepted one, and also because the concession of the necessity of the State undertaking the support of research laboratories from this political standpoint will involve the concession of the same thing *à fortiori*, from the standpoint which involves a wider interpretation of the functions of government.

Now, it may be urged in favour of the State undertaking the support of laboratories for the investigation of disease, that this is



really not a new function which the State is asked to assume, but rather the more complete discharge of a function which every civilised government has long since felt it its duty to discharge. The administration of sanitary regulations by the Government, the institution of national vaccination, including the supply of pure calf vaccine for the purpose, and the investigation into the causes of outbreaks of epidemics under the Local Government Board, the compulsory notification of infectious disease, and the universal registration of the cause of death, are instances of many-sided functions already undertaken in England by the State in connexion with the study of disease with a view to its prevention. The endowment of permanent laboratories for the study of the general causes of disease would only be a completion of the policy inaugurated by the Local Government Board in making particular grants for the investigation of particular facts in the ætiology of disease.

It is evident, however, that the system, as we have got it in England, is unsatisfactory, inasmuch as it is incomplete. The scientific men to whom the grants are made are considerably hampered in their work by the lack of appliances, such as a well-equipped State laboratory would afford; and the uncertainty of permanent employment, and the expenses of the work of research which may come to be borne by the investigators out of their own funds make the profession of scientific research one which it is only possible to pursue in England under conditions of financial risk. Further, the absence of well-equipped and well-officered laboratories at home compels the young Englishman to go abroad for the purpose of obtaining his scientific training.

To one, indeed, who has frequented the foreign schools of higher learning, the consciousness comes home very vividly of the condition of parasitic existence—in all matters at least relating to medical research—in which England is living. We do not do our share among the nations in the sphere of scientific medical research, though through the genius and self-sacrifice of individual workers we have not entirely dropped out of the race.

Though, as has been stated, something at least of what individuals can do has been done, what the nation as a nation ought to do has been left utterly undone; and yet it must be the unconscious will of the nation, the unconscious will of which a real statesman would feel himself to be the interpreter, to do our share in every work, like that of medical research, which will ultimately renovate the world.

Our Australian Colonies, who have had the question of the relation of the State to the endowment of medical research before them in many ways, have decided the question, as I understand it, in favour of undertaking that function.

In one of its aspects the subject is closely interlinked with the question of university medical education, and with that of the building and equipment of laboratories in connexion therewith. With reference to this I may, perhaps, say that the Government of New South Wales has built and equipped in Sydney a series of laboratories and a hospital in connexion with the medical school of the university in a style of

dignity and completeness with which one is quite unfamiliar in England, and which reminds one of the full equipment of certain foreign universities. In the Universities of Adelaide and Melbourne, it is evident that the Governments of the sister Colonies take a very similar view of the functions of the Government in respect to medical education. I have, however, here touched upon a subject which is really wider than that proposed for discussion, inasmuch as it involves the general subject of the endowment of higher education.

The Governments of the Australian Colonies have also been brought into relation with the question that forms the subject of this paper in other ways; notably by the existence of the rabbit plague, and the possibility of a remedy for it being discovered on the lines of bacteriological research. Attention has also been drawn to the question by the occurrence of leprosy in the Colonies, and the necessity of taking some steps to prevent its increase.

It may, however, be remarked that the whole question is more urgent in the Colonies than it is at home, because the climatic conditions, differing from those obtaining in Europe, naturally give rise to a different series of problems which require investigation upon the spot.

The remoteness from Europe, and the uncertainty of the arrival of reliable information through ordinary channels also has an influence in this direction. It, for instance, determined the Governments of the three southern Colonies to depute in each case one of the professors upon the medical staff of the universities to proceed to Berlin last year in order to report upon Koch's method of treating consumption.

It may, however, be rejoined that the condition of things in new countries like the Colonies is totally different to that at home, inasmuch as it would there be a question of the necessary endowment for such objects either coming from the State or not coming at all, whereas in England the object could be attained by the combination of individuals. It might further be urged in support of this view that we have in England laboratories which owe their establishment and support to semi-public corporations like the Universities and the conjoint Colleges of Surgeons and Physicians in London and the College of Physicians in Edinburgh, and to testamentary dispositions like that to the Brown Institution.

It might also be rejoined that there are now available at home in all a good number of research scholarships granted by the munificence of such corporations, for instance, as the Worshipful Company of Grocers, and that these make any State endowment of medical research unnecessary.

The following answers may, however, be made to these objections:—

- (a.) The beneficence of individuals should not be taxed for the common good of all.
- (b.) In Australia the State has undertaken these duties in face of such a munificent grant as that of the Challis bequest (over 2,500,000*l.*) made to the University of Sydney.

- (c.) The laboratories at present existing in England are insufficient, and their equipment inadequate, owing to a great paucity of funds.
- (d.) The research scholarships, though invaluable as endowments for a certain number of workers, do not constitute a provision for laboratories, nor for the development in England of higher schools of research, the absence of which hampers the progress of medical research both in England and in her Colonies, whose students would naturally be drawn to research in larger numbers if this means of education were provided in England.

Finally, the whole question of medical research is complicated with the question of vivisection. The unconscious, or at any rate, the silent will of the people may be assumed to be in favour of vivisection constituted as it is at present, *i.e.*, vivisection limited only by the necessary restraints upon inhumanity; on the other hand, the will of a small minority, which is the only will that makes itself audible upon the matter is against vivisection in any form.

The will of this minority, however, deserves some attention, because it is the will of a not entirely negligible fraction of the population, to the majority of whom the movement recommends itself as from an *à priori* point of view a humane movement. In a minority of cases the opposition to vivisection is the outcome apparently of a very strong conviction. Where this is the case, reasons in favour of vivisection may perhaps, without injustice, be assumed to be like water upon the sieve of the Danaides; but, if reasoning in favour of vivisection should even here be of any avail, one might urge the following considerations in its favour: the good that results from medical research is everywhere present with us; the infliction of the necessary suffering for the attainment of that good is relatively small; and with regard to that suffering, we have only to remind the opponents of medical research that even if they succeeded better than they can ever hope to succeed, and were able to put a stop to all vivisection in England, still the animal suffering would not be lessened, for those engaged on medical research on the Continent at present and the future generations of men like them, both in England and on the Continent, would continue the work until the preventible human suffering had been overcome.

The anti-vivisectionists may delay the acquirement of the knowledge through which alone that suffering can be overcome, but they are powerless to lessen the animal suffering which must be inflicted before it can be obtained. The course has to be traversed, and will be traversed, in spite of the hindering, and if the anti-vivisectionists would listen to reason, they could learn both that the animal suffering is minimised; and also, perhaps, that it was not any political agitation that introduced to the vivisectionist the use of chloroform and morphia, which no one more than he knows to be the best gifts of nature to the sufferings of all her creatures.





## DISCUSSION.

**Miss Annie Goff** (London), speaking as a nurse, objected to the methods advocated. She believed that in countries where they had been practised, cancer-grafting and needless ovariectomy had been performed.

**Dr. Haughton** (London) thought that the demand for State aid out of public funds to promote medical research involving experiments on animals could not be justified unless the objections entertained by many people were met more fully than hitherto. He referred to experiments which he considered misleading, such as those on mercury by a committee of the British Medical Association; and to investigations which produced no result, such as those on snake-poison in India. Public money might, however, be spent on objects as to which there was practical agreement among intelligent and well-informed people.

**Dr. Chapman** (Paris) commented on the growing tendency in England to call upon government for a greater variety of help. He believed that when a government had provided for its country's defence, and for the conduct and administration of justice, its proper functions were nearly exhausted. There had been many signal failures in medical investigations, and he thought we should be slow to ask for State aid in conducting them.

**Dr. Tomkins**, in reply, said that even if it were true that much scientific work had produced small results, this would not be a reason for ceasing from it. Government spent money freely in experimental work connected with explosives, ships, and guns, and in these even negative results were valuable. So with scientific work. The suggestion that the State should do nothing was bad in face of what is being done by the Local Government Board in England; and he urged that the scientific work of that department should be placed on a more complete and satisfactory basis.

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### Suggestions for the Constitution of an International Convention on Hygiene.

BY

**Dr. ERNST BELOW**, Cönnern, Germany, late Physician-in-Chief to the Mexican Central R. R. Hospital, Professor of the Faculty of Medicine, Mexico.

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A. The experiences of the last 12 years have proved that the civilized world can be invaded at any time by new and unknown epidemics, which arise generally from the less civilized parts, mostly from the tropical or subtropical centres of traffic, where sanitary control is insufficient. Even the strictest control there by one or another government is not sufficient to find out the necessary particulars about the origin, the march, and the extermination of an epidemic, unless the governments of all civilized nations co-operate. For such a purpose we need an international co-operation, guided by the principles of medical, climatological, and hygienic science and practice. The formation of such an *International Hygienic Convention*, as it may be called, is the first and principal suggestion.

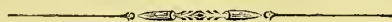
B. This International Hygienic Convention may be established on similar principles to the Postal World's Union. Four committees ought to be elected, each central committee consisting of 5, 8, or 12 members (professors of Hygiene and their assistants) and being entitled to elect sub-committees for the different places in the various zones. I.—The committee for hygienic inquiries, *i.e.*, for elaborating inquiries about meteorology, climatology, physiology, pathology, sanitary measures, hygienic observations, and experiments (reports to be sent annually or biennially to the prominent physicians in the different latitudes and altitudes, especially in the tropics and sub-tropics). II.—The committee for election of those four principal central committees, constituting the International Hygienic Convention, and for the election of all the necessary officers for observation stations, for the scientific expeditions, and for executive international health officers. III.—The financial committee, for collecting funds for international sanitary objects, which no civilized government should refuse. IV.—The governmental committee, to solicit the moral and essential help of the respective governments in regard to medical education and executive measures, in regard to financial funds and instruction and equipment of health officers. Or, if it should be more convenient, *only one Central Committee*, for taking into consideration all the necessary arrangements, may be elected to begin with.

C. The work of the four committees, which may meet in some central place every two or three years, should consist in a strict observation and control of everything which could concern the origin, the progress, and the extermination of an epidemic. For this purpose the attention of the central committees should be directed to the following three principal points:—1. Scientific experiments; 2. Practical medical experience; 3. Sanitary and hygienic measures.

The object of the work of the committee will be:—1. Formation of scientific stations, and observations at different important places; 2. Establishment and constant reorganization of a regular international central board of health, with its sub-committees, with executive power for preventing epidemics, and helping to fulfil all the international hygienic duties; 3. Co-operation, scientific and practical, with a well distributed medical staff throughout all the countries belonging to this International Hygienic Convention.

Those co-operators are to be chosen from out the number of all the physicians who show sufficient ability and interest in answering the named inquiries. This will be the duty of the election committee, after getting the answers to inquiries instituted.

Fuller information about this important subject is given in papers read before the International Medical Congress, 1890, at Berlin, in Section 16; at the Congress of Physicians and Naturalists at Heidelberg, 1889, in Section 25; and at the Bremen Congress, 1890, in Section 25; the first-named has not yet been printed separately, but may be found in the Transactions of the International Medical Congress of Berlin.



Wednesday, 12th August, 1891.

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The Chair was successively occupied by  
Dr. ED. RITTER VON HOFFMANN (Vienna) ; and  
Dr. W. P. RUYSCH (The Hague).

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American Municipal Hygiene in Relation to the Housing  
of Labour.

BY

E. R. L. GOULD, Ph.D., Expert, U.S. Department of Labour,  
Washington.

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Within the memory of the most of you whom I have the honour to address to-day, what we may call the social problems of the city were of little importance in the United States. Optimists there were who assured us confidently that we should never feel their pressure, the power of assimilation, an unlimited territory, and unrivalled facilities for economic betterment affording an effectual shield. But these prophets counted without their host. Their vision did not include the modern city with its corruption, misrule, and neglect ; with its teeming multitudes crowding one another for room, panting for air, and struggling for a meagre livelihood.

The American city creates itself with appalling suddenness. It seems possessed with octopus' arms, despoiling weaker neighbours on the one side and gathering in fully three-fourths of foreign immigration on the other. A short half-century ago the urban population of the United States was 8·52 per cent. of the whole ; to-day it is 29·12 per cent., in other words, almost one person out of every three, in a country of such immense territorial area, lives in some centre having over 8,000 inhabitants. During the lifetime of a single generation it has nearly doubled. In 1860, 16 persons out of every 100 were city residents ; in 1890, 29. In the North Atlantic tier of States one-half, and in the northern central division one-third of the people belong to urban communities. The following table, drawn from the last census, will portray clearer than words the rapid increase of population in a few individual



cities. It is not a partial record, the whole number of those having upwards of 100,000 souls each being included :—

Cities.	Population, 1890.	Per Cent. of Increase during 10 Years.	Cities.	Population, 1890.	Per Cent. of Increase during 10 Years.
New York, N.Y. -	1,515,301	25·62	Detroit, Mich. -	205,876	76·96
Chicago, Ill. -	1,099,850	118·58	Milwaukee, Wis. -	204,468	76·90
Philadelphia, Pa. -	1,046,964	23·58	Newark, N.J. -	181,830	33·20
Brooklyn, N.Y. -	806,343	42·30	Minneapolis, Minn. -	164,738	251·35
St. Louis, Mo. -	451,770	28·89	Jersey City, N.J. -	163,003	35·02
Boston, Mass. -	448,477	23·60	Louisville, Ky. -	161,129	30·20
Baltimore, Md. -	434,439	30·73	Omaha, Neb. -	140,452	360·23
San Francisco, Cal. -	298,997	27·80	Rochester, N.Y. -	133,896	49·83
Cincinnati, O. -	296,908	16·37	St. Paul, Minn. -	133,156	221·07
Cleveland, O. -	261,353	63·20	Kansas City, Mo. -	132,716	137·91
Buffalo, N.Y. -	255,664	64·80	Providence, R.I. -	132,146	26·02
New Orleans, La. -	242,039	12·01	Denver, Colo. -	106,713	199·51
Pittsburg, Pa. -	238,617	52·58	Indianapolis, Ind. -	105,436	40·48
Washington, D.C. -	230,392	29·71	Allegheny, Pa. -	105,287	33·81

These statistics show that cities which 10 years ago counted already more than half a million each have added more than two-fifths to their number during the decade, while the average rate of increase of the whole 28 has been 45 per cent. New York grew one fourth during the same time that London gained a tenth, and Paris a twelfth. This rapid concentration of population gives rise to grave dangers, the most far-reaching of which to my mind is the herding of the labouring masses in insanitary dwellings with all the physical and moral consequences attendant thereon.

About 25 years ago the moral conscience of New York awoke in earnest. This action was exemplified in the organization of a Health Department pursuant to an Act passed by the State Legislature in the preceding winter. Legislative activity itself had been powerfully stimulated by a public-spirited citizen's association, who followed up the labours of a State commission that had been without practical results, and laid bare to the public a frightful state of things. The most densely populated ward in the city was found to exceed the East London district by 60 per cent.—290,000 as against 175,000 people to the square mile.\* Four hundred and ninety-five thousand of New York's total 850,000 lived in tenement-houses and cellars. In typical houses of this kind less than one-third of the bedrooms had any provision whatever for receiving light and air, except through a door leading to the family living-room. The vast majority of this great multitude were compelled to sleep in rooms that were dark, unventilated, damp, and pestilential. Of water-closets and plumbing generally, the most harrowing tales were told. The drainage most often had no connexion whatever with the sewer. No authority expostulated with the landlord

\* The most densely populated ward of New York to-day contains one-third of a million to the square mile.

when he located a privy under the stairway or at the end of a dark hall for the sole and undivided use of from 60 to 100 persons, any more than it hindered him from running up a rear tenement on the unbuilt portion of his lot, so close to the front that light and air were almost entirely shut off from the denizens of the lower floors. In fact, the regime of "laissez-faire" was in full swing; the death-rate was one in 33.

The new Health Department had no sooner entered upon its functions than the Legislature confided to it a limited sanitary control over tenement and lodging houses. An inquiry made at the outset into the condition of these classes of dwellings showed that, out of a total of 18,582 tenement houses in the city, 52 per cent. were insalubrious, while 32 per cent. of the whole had reached this state "purely" "from overflowing accumulation of filth, want of water-supply, and "other results of neglect." The next 12 years' efforts were mainly directed to vacating cellars as places of residence, putting ventilating windows into dark bed-rooms, lighting and airing hallways, arranging water-closets, cleansing and ventilating privy-vaults, improving drainage, whitewashing walls and ceilings, and cleansing, generally, yards and areas. One result accomplished was the lowering of the death-rate to 1 in 38. In 1873 the Health Department was re-organised, and from time to time since, notably in 1879, 1881, and 1887, its powers in relation to the subject we are now discussing have been largely increased. Let us see how the case stands to day.

At the head of the Health Department of the city of New York is the Board of Health, which consists of the President of the Board of Police, the health officer of the port, and two commissioners, one of whom must have been a practising physician for at least five years preceding his appointment. The other commissioner, who is by designation, the president, must not be a physician. Both commissioners hold office for six years. The Department of Health is divided into two bureaus: one, the sanitary bureau, the chief officer of which is called the sanitary superintendent, who at the time of his appointment must have been for 10 years a medical practitioner, and for three years a resident of the city; the other, the bureau of records, dealing with vital and other statistics. The sanitary bureau is composed of four divisions, two of which, that of general and special inspection, and that of plumbing and ventilation are of particular interest to us.

In order to make the semi-annual visitation of tenement houses\* required by law, and to enforce the various regulations of the sanitary code, two officers and 43 policemen of good record, and tried experience, are detailed by the Board of Police to serve continuously under the

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\* The legal definition of a tenement-house: is "every house, building, or "portion thereof, which is rented, leased, let, or hired out to be occupied, or is "occupied as the home or residence of three families or more, living independently "of each other, and doing their cooking upon the premises, or by more than two "families upon any floor, so living and cooking, but having a common right in the "halls, stairways, yards, water-closets, or privies, or some of them."

Health Department. They are known as the sanitary company of police, and being amenable to the Board of Police for discipline, they know that their tenure of office depends upon good behaviour. Consequently they learn to do their best, and to take pride in their work. While on inspection duty, each sanitary policeman carries a memorandum book, in which he enters the street and number of the house, date of inspection, and notes if any cause for complaint is found.\* He rectifies minor nuisances himself, but such as he cannot deal with, either through the unwillingness of the party responsible, or because of lack of technical knowledge, he calls to the attention of the Board of Health. An order is then made, which he ordinarily executes, but always, where technical questions are involved, the matter is placed in the hands of one of the regular sanitary inspectors for inquiry and report, before final disposition is made. One of the most important duties of the sanitary police is to make night inspections of tenement and lodging houses, to see that overcrowding does not occur. This function is by no means infrequently exercised.

For special—one might, perhaps, better call it technical—sanitary inspection, New York is divided into 25 districts, to each of which is assigned an inspector. To this official are referred citizens' complaints for investigation and recommendation. He must possess a thorough knowledge of his district, make a general sanitary inspection of it from time to time, informing his superiors of all causes for complaint, and when called upon make a special report upon localities which may become dangerous to life and health. He is required further to render expert service by inspecting, during their construction, and again after their completion, all new and remodelled buildings in his district; to see that the regulations of the Board of Health regarding dimensions, safety, plumbing, drainage, light, and ventilation are fully observed.

The sanitary requirements laid down for buildings which were already occupied as dwellings when the Board of Health was created, may be briefly summarised as follows:—No construction can be used as a tenement or lodging house unless the halls open directly to the external air without room or obstruction of any kind at the end, and unless they have also a ventilator at the top, of a design sanctioned by the inspector of buildings. All inside rooms must have ventilating or transom windows of three square feet in area on two of their sides, through both of which the air from the outside may be drawn. Water-closets must exist in the ratio of one for every two families (or 15 lodgers in the case of lodging-houses). These, as also sinks, must be provided with doors, soil-pipes and traps, properly ventilated, and the necessary fixtures for cleansing and flushing. All sewer connexions, drainage, and plumbing work are required to conform in plan, materials, and workmanship to the directions of the Board of Health. Privy vaults can only exist under a special permit. Likewise, the continuance of basement cellars as places of habitation is stringently regulated and

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\* A list of subjects upon which sanitary policemen make report on their rounds of inspection is given in Appendix A.



subjected to the pleasure of the Board. Garbage-boxes, clean areas and yards, sound roofs, protected stairways, and fire-escapes are enjoined. Tenement houses must be carefully inspected twice a year, in addition to such inquiries as naturally follow complaints, and every interior disposition thoroughly cleansed at the pleasure and to the satisfaction of the Board. In addition, every owner, lessee, or lodging-house keeper, must thoroughly whitewash the walls and ceilings semi-annually in April and October. Six hundred cubic feet of air space in tenement, and 400 feet in lodging-houses is stipulated for each occupant, and when this limit is passed the Board has the authority to make the necessary reduction. Whenever a tenement house gives shelter to more than eight families, and the owner does not himself reside therein, the Board may require him to keep a janitor or other responsible agent on the premises. The sanitary authorities are empowered to order the vacation of any building or part of building "which by want of repair has become " dangerous to life, or is unfit for human habitation, because of defects " in drainage, plumbing, ventilation, or the construction of the same, or " because of the existence of a nuisance on the premises, and which is " likely to cause sickness among its occupants." Service is made by posting the notice conspicuously in the building and personally notifying the owner, lessee, agent, occupant, or whoever is in charge. In case the responsible party cannot be found, lives outside the city, or evades service, mailing the notice to his last known address is sufficient. A vacating order may take effect within 24 hours after service. Every owner and person having control of tenement and lodging-houses must file with the health authorities a statement giving his name, address, a description of his property, the number of rooms and apartments, the number of families occupying them, and the forms of business or occupation pursued on the premises. This power of vacation proves a most effective weapon. Twenty-nine such orders were issued last year in New York, and in every instance, before being executed, the proprietors made the improvements demanded.

The penalties attached to violations of any of the foregoing provisions are fines ranging from 10 to 100 dollars, or imprisonment not exceeding 10 days, for every day's neglect. The judge may combine fine and imprisonment if he choose. A further liability of 10 dollars a day during the continuation of the offence is also incurred, in addition to the expenses of abatement. Appropriately enough, moneys coming from these sources pass to the "tenement-house fund." It was created in 1879, and consists of 10,000 dollars annually appropriated for the employment of 48 physicians, who, during the summer months, visit, prescribe, give advice for the care of sick and infants, and correct, as far as possible, insanitary conditions in the tenement districts of the city. Suit is brought in a court of higher resort, and trial is had before a judge, unless the defendant demands a jury upon a question of fact.

Such are the remedial powers at the disposal of the New York Board of Health in relation to the housing of the industrial classes. It is invested as well with certain preventive faculties, which are, if anything, more important. It has control over the construction of all new

tenement and lodging-houses in respect to light and ventilation, and of every newly erected public and private building as regards plumbing and drainage. All work must be done in strict accordance with plans having its written sanction. Fulfilment is secured through frequent inspection, and the stoppage of further progress when prescriptions are being violated. The law ordains that tenement or lodging houses on ordinary lots may not extend farther than to 10 feet from the end of the rear lot line, and must not cover more than 78 per cent. of the ground. Air-shafts or open courts take up the remaining 12 per cent. Exceptions are made of corner lots, where four feet of open space is required at the rear, so as to ensure circulation of air throughout the whole block. Rooms must be eight feet high, and every sleeping apartment have at least one window of specified dimensions, admitting light and air directly from the street or yard. A sufficient water-supply is furnished to each floor, and one fire-place or chimney to every family apartment.

Plumbing and drainage are completely under the supervision of the Health Department. Every plumber must there register his name and address, and do his work in conformity to specifications officially approved and left on file. The value of the materials and workmanship are subsequently demonstrated by the application of the pressure test of ten pounds to the square inch, without which no plumbing is accepted. There is now no trouble in fulfilling all requirements, since the water service is not available until the Department of Public Works, which controls it, has been duly notified by the sanitary authorities that the plumbing has been satisfactorily done.

Finally, a permanent commission on tenement-house reform, composed of the mayor, one commissioner of health, a delegate from the Bureau of the Inspection of Buildings and the Commissioners of Public Works and Street Cleaning, meets annually to formulate recommendations to the State Legislature for improving existing laws.

What have been the effects of this sanitary legislation? Has it been really enforced? In truth, it must be admitted that as the legislation was progressive, so was its execution; and, furthermore, that the latter did not always keep pace with the former. Landlords whose instructions in relation to their property were usually comprised in the laconic formula, "collect the rents in advance—failing, eject the tenants," were liable to demur when overcrowding was repressed, and the sanitation of the premises improved at their expense. Speculative builders and old-fashioned plumbers could not at once be brought to see the necessity of providing so much light and air or an approved system of drainage for the use of the poor man. Alike, these two classes regarded the provisions of the law as an outrageous interference upon private rights; in other words, a certain curtailment of their sources of revenue. But whenever they were discovered evading the rules, they found to their cost that it was cheaper to obey. The courts uniformly sustained the Board, and even brushed away some misty cobwebs about the unconstitutionality of the State, thus aiding the labourer to get a sanitary home. The Health Department has acted continuously with

tact and firmness, progressively raising its standard in response to an enlightened public opinion.

A few pages back you will recall a description of the shelters offered to wage-earners in 1866. Let me supplement it with an official picture\* of the tenements erected to-day, not for purposes of philanthropy, be it understood, but for speculation. "The plans upon which tenement-houses are now built are in many respects superior to the plan of a model tenement-house which was awarded first prize in the famous Plan Competition of 1879, although that plan at the time was generally regarded as too utopian ever to be equalled by tenement houses erected by speculative builders in this city. The tenements now building for four families on each floor cover not more than 78 per cent. of inside lots. They are permitted to extend to within 10 feet of the rear lot line, as this secures larger courts to light interior rooms. These courts must in each house aggregate 265 square feet; and, inasmuch as a number of houses are usually built together, the rooms on each side of each of them are lighted by windows to a common court of that area. The end rooms of each of the four suites per floor have windows to the largest section of the courts. These enlarged sections also on one side light the stairs and halls, and on the opposite side light the water-closet compartments. Water-closet compartments are ventilated by means of a special shaft discharging foul odours above the roof. Fanlights are placed over each door, where necessary, to ensure a cross-current of air through each room. Two water-closets are required on each floor, flushed with a copious supply of water. A sink and set of wash tubs are provided in each kitchen, and in many cases a hot-water supply and even bath-tubs, one for every two families, are furnished. The light courts in houses of this grade, as well as of other grades, are as large as is consistent with rooms of suitable size for habitation. The ceilings of all new tenements are comparatively lofty, averaging over nine feet in height. Cellars have all the light possible from windows opening on yards, courts, and areas; and their floors are thoroughly concreted, and their ceilings lathed and plastered. Finally, the value of the space required at the rear of all houses on inside lots for light and ventilation is materially enhanced by the open space of four feet required at the rear of corner houses, as a means of securing circulation of air throughout city blocks."

Here is one result which the interference of the State has brought to New York city. Let me call your attention to another, which, though expressed in cold Arabic, tells a no less heart-stirring tale. In 1870, 51 per cent. of the population lived in tenements and apartment houses or flats. In 1890 the dwellers in tenement-houses alone numbered 73 per cent. of the whole. The death-rates per 1,000 were 28·84 and 24·58 at the two periods respectively, while the mortality of children under five years of age fell from 49·06 per cent. to 40·66 per cent. of the total mortality. Do not forget that this improvement has been

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\* Annual Report, New York Board of Health, 1890, p. 50.



accomplished concurrently with a gain of nearly one-fourth in the relative proportion of the labouring population to all other.\*

It would be most interesting to note, did time permit, the control exercised by the sanitary authorities over the homes of the wage-earner in other principal American cities. As a whole, one may say that the provisions are more general in character, and, therefore, are apt to lose much in power of execution. Often the inspecting force is inadequate, and overcrowding cannot be attended to as it should. Nevertheless, the testimony of nearly all the municipal health authorities I have consulted is that the labourer is better housed to-day than 20 years ago. In most directions there is a well-marked and progressive tendency towards increasing State, *i.e.*, municipal, control. Younger communities, forewarned by the experience of their metropolitan sister, are forearming themselves with judicious building and plumbing laws. Chicago, St. Louis, Baltimore, Boston, Pittsburg, Newark, Cincinnati, Lowell, and Minneapolis, may be mentioned amongst others.† Herein lies the preventive features of the remedy. Good examples are never without influence. They are all the more powerful in this case, because improved dwellings force by competition an amelioration in the rest. In response to business needs, many old houses must sooner or later disappear, and those which remain, from diminishing numbers, can be more easily handled. The victory is more than half gained when the future is well provided for.

State control in reference to the homes of the working classes is the topic we are discussing to-day. There is no doubt in my mind that a beneficent tutelage has been exercised over New York. Ought it to go further? To some European communities I could name, the powers of the New York Health Department would seem quite drastic enough, but their policy has been to wipe out notorious localities that could not be any longer tolerated, instead of by an unified, active, well-equipped sanitary administration gradually to improve what already existed, and effectually to look out for the future. One dare not enter into the moral phases of this question, for so deeply do they permeate the framework of society, that one is almost disposed to sanction anything, however trenchant, which promises to give to the poor man a civilised home. I must confess that practical observation and study of the conditions under which an untold number of human beings must live in the metropolitan centres of the old world and the new, have led me to look chiefly to the only power I believe to be strong enough to cope with them, *viz.*, the State. The existence of some form of sanitary control everywhere is the best evidence of its necessity. Let it then be endowed with sufficient authority to render its acts effective, otherwise

\* There will be found in Appendix B. a table extracted from the Annual Report of the New York Board of Health for 1890, giving the proportions of infant to total mortality during the last 15 years.

† In Appendix C. will be found a complete text of the Sanitary Code of the Newark, N.J., Board of Health, in so far as it relates to plumbing and drainage. This particular one was chosen because, being the most recent, it contains the most thoroughly approved dispositions.

confidence will fail, and public opinion give but a half-hearted support. The prerogatives enjoyed by the New York Board of Health furnish a good foundation. To these a few more might be added. A house-to-house inspection of all buildings harbouring more than three families should be made at least as often as six times a year. This is better than letting visitation follow citizens' complaints, because resentment is not likely to be aroused when all are treated alike. The larger force necessary is hardly worth considering, for there would be fewer complaints from outsiders to be investigated. Again, the proprietor of every house inhabited by more than eight families should be compelled to keep a janitor on the premises. The presence of such an agent promotes carefulness and cleanliness on the part of the tenants. Imprisonment without the option of a fine should be meted out to persistent violators of sanitary ordinances, say, after the third offence.

I think, however, the most effective of all regulations would be one requiring every owner of houses offered for rent to take out a license from the health authorities, such licence to be gratuitous, and conditioned only upon the sanitary state of the premises. He should be liable to produce a proper certificate upon the demand of an intending lessee. As an offerer of commodities he ought certainly to show that they are not hurtful before being permitted to dispose of them. In some civilised countries it is held to be wise policy, from the standpoint of public health, to regulate, by means of licence and inspection, the prosecution of a certain nameless profession. Why should a protection be denied to him who creates, while being offered to him who violates a home?

In economic matters the spheres of the individual and the State are as hard to define as it is in theological realms to trace the respective limits of sovereignty and free will. But the physical and moral issues involved in the question before us release it from the purely economic category. Justice is at the bar, and I have confidence enough in its final triumph to believe that the interests of property will not always be held paramount to the value of human life, however humble, or to the fundamental factors of a moral civilisation.

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#### APPENDIX A.

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The following is a List of Subjects upon which the Sanitary Police must make report in connexion with each house.

##### *Location.*

Number of families.		Housekeeper on premises
Number of occupants.		Owner on premises.
Privy accommodations—number of sittings.		

##### *Cellars, if occupied for Dwelling Purposes.*

Whether floor is water-tight.		Whether the ceiling is plastered.
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##### *Yards.*

Whether properly graded.		Whether sewer connected.
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*Front Areas.*

Whether graded.	Sanitary condition.
Whether sewer connected.	

*Waste Pipes.*

Whether joints are connected with cement or lead.	Whether trapped.
	Whether ventilated two feet above the roof.

*Soil Pipes.*

Whether joints are connected with cement or lead.	Whether trapped.
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*General Inspection.*

Cellars.	Skylights.
Stairs and balusters throughout the house.	Leaders.
Walls and ceilings of halls and rooms throughout the house.	Eaves-gutters.
Floors of rooms and halls throughout the house.	Chimneys.
Slop-sinks, whether trapped and ventilated.	Fire-escapes.
Wash-basins, whether trapped and trap ventilated.	Water-closets, whether trapped and trap ventilated.
Bath-tubs, whether trapped and trap ventilated.	Privy vaults.
Potable water supply pipes.	School sinks.
Roof.	Privy-houses.
Wash roof.	Cesspools.
	Urinals, whether properly flushed.
	Clothes-poles.
	Fences.
	Hydrants in yard.
	Air-shafts.

*Ash Receptacles.*

Whether sufficient.	Whether kept within stoop-line.
In sanitary condition.	

APPENDIX B.

TABLE giving the PROPORTION of INFANT to TOTAL MORTALITY in NEW YORK CITY during the last 15 years.

Year.				Per cent. of Total Deaths.		
				Over 5 Years.	1 to 5 Years.	Under 1 Year.
1875	-	-	-	51·65	20·54	27·81
1876	-	-	-	51·26	20·72	28·03
1877	-	-	-	53·03	18·66	28·31
1878	-	-	-	54·05	19·65	26·29
1879	-	-	-	54·92	18·37	26·70
1880	-	-	-	54·13	18·55	27·32
1881	-	-	-	54·08	20·83	25·09
1882	-	-	-	53·80	20·18	26·02
1883	-	-	-	59·26	15·25	25·49
1884	-	-	-	56·41	16·09	27·50
1885	-	-	-	57·21	16·71	26·08
1886	-	-	-	56·84	16·84	26·32
1887	-	-	-	56·94	17·16	25·90
1888	-	-	-	56·79	17·29	25·91
1889	-	-	-	56·77	16·70	26·54
1890	-	-	-	59·34	15·00	25·66



## APPENDIX C.

*Supplement to the Sanitary Code adopted by the Board of Health of the City of Newark, N.J., October 1890.*

Supplement to the Sanitary Code of the city of Newark, N.J., to compel, prescribe, regulate, and control the plumbing, ventilation, and drainage of all buildings, public and private, and the connexion thereof with outside sewers, cesspools, or other receptacles, and to require plans for the same, with necessary drawings or descriptions, to be submitted to said board for inspection and approval, and to require all master plumbers to register their names and addresses at the office of the board.

Be it ordained by the board of health of the city of Newark as follows:—

SECTION I. Every master plumber engaged in business in the city of Newark, N.J., shall appear in person at the office of the board of health in said city and register his name and place of business; and shall give immediate notice to said board of any change in said place of business.

SECTION II. Before any portion of the plumbing and drainage system of any building shall be constructed there shall be filed in the office of the board of health a plan and specification thereof signed by the owner, showing the said plumbing and drainage system entire, from its connexion with the sewer, cesspool, or vault, throughout the entire building, together with the location of all fixtures, traps, ventilating pipes, &c. Said plan and specification must be approved by the board of health and the name of the plumber attached thereto before any portion of the work shall be executed. Before any changes are made in the direction of pipes or location of fixtures they must first be approved, and said changes made on the original plan on file. In case any changes or alterations in existing systems are made, the board of health must be notified of that fact, and if in its judgment a plan of the new work is necessary, the same must be furnished. Drawings and descriptions of the plumbing and drainage of buildings erected prior to the passage of this regulation may be placed on file in the office of the board.

SECTION III. When an original plan of any plumbing and drainage system is filed in the office of the board of health, a fee of two dollars will be charged to defray the expenses of inspecting the plans, of filing, and superintending the testing of the work.

SECTION IV. The health officer shall be notified promptly by the plumber when the plumbing and drainage work of any building, or any portion thereof, is completed and ready for inspection and testing. All inspections and testings shall be made as soon as possible after such notification. Any such system put in and covered without due notice to the health officer must be uncovered for examination at the direction of said officer.

SECTION V. All houses and other buildings on premises abutting on a street in which a sewer is laid or shall be laid, shall be connected with said sewer by the owner, agent, or lessee of said premises, when the board of health shall so require, and written notice to connect with said sewer shall be served on said owner, agent, or lessee, personally, or by leaving a copy at his or her residence, place of abode, or in the case of a non-resident owner, by leaving a copy with an adult occupant of the premises.

SECTION VI. No building or premises shall be connected with any sewer, cesspool, or vault without a permit first obtained from the board of health, and it is further required that the permit shall be kept on hand during the progress of the work to which it relates, and that it shall be exhibited whenever required by the proper officers of the board. The conditions of this permit must be strictly complied with. This regulation applies to all sewers, whether on private property or in public streets or alleys. Before laying the drain from the building to the sewer, cesspool, or vault, and after the trench is graded, the bottom of the trench must be carefully rammed to avoid unequal settling of the drain. After the pipe

is laid, as the trench is filled the earth must be tightly rammed as near as possible to its original compactness. Tunnelling is prohibited, unless the consent of the board of health thereto has first been obtained.

SECTION VII. When the ground is made or filled in, the drain extending from the sewer, cesspool, or vault to the foundation wall must be of extra heavy cast-iron pipe, of such diameter as may be approved by the board of health. Such pipes shall be laid with the joints properly caulked with lead.

SECTION VIII. Where the soil consists of a bed of loam, sand, or rock, the drain may be of hard, salt-glazed, and cylindrical earthenware pipe, not less than three-quarters of an inch in thickness, free from defects, laid on a smooth bottom, free from all projections of rock. Each section must be wetted before applying the cement, and the space between each hub and the small end of the next section must be completely and uniformly filled with the best hydraulic cement. Care must be taken to prevent any cement being forced into the drain to become an obstruction. No tempered-up cement shall be used. A straight-edge must be used inside the pipe, and the different sections must be laid in perfect line on the bottom and sides.

SECTION IX. When a building is to be connected with a sewer, cesspool, or vault, it must be connected by a drain not less than four inches in diameter, having a fall of not less than one-quarter of an inch to the foot, if practicable. Old drains cannot be used for new houses, except by permission from the board of health.

SECTION X. When there is no sewer in the street on which a building faces and it is necessary to construct a private sewer to connect with a sewer on an adjacent street or avenue, it must be laid outside of the curb, under the roadway of the street, and not through yards or under houses, without a special permit from the board of health.

SECTION XI. House-drain connexions with pipe sewers must be made with Y branches in all cases where possible.

SECTION XII. All horizontal drains within and to a distance of six feet beyond the walls of buildings shall be of cast iron, with caulked leaden joints, or wrought-iron screwed joints, and shall be so located as to be readily accessible for inspection. The house drain within buildings shall be securely hung on the cellar wall or properly suspended from the cellar ceiling, unless this is impracticable, in which case it must be laid in a trench, cut at a uniform grade. The house drain and all soil and waste pipes shall have a fall of at least one-quarter inch to the foot, and more if possible. Said drains shall be provided with openings for cleansing purposes, the same to be closed by screw plugs.

SECTION XIII. A running or one-half S trap must be placed on the house drain at an accessible point near the house wall. This trap must be furnished with a hand-hole for convenience in cleansing, the cover of which must be properly fitted and made gas and air-tight with some suitable cement properly applied.

SECTION XIV. Every house drain shall have an inlet for fresh air, not less than four inches in diameter, entering on the house side of the trap and leading to the outer air, opening at some place shown on the approval plans, not less than 10 feet from the nearest window. No cold air-box for a furnace shall be so placed that it can by any possibility draw air from this inlet pipe.

SECTION XV. All cast or wrought-iron pipes and fittings must be sound, free from sand holes and other defects, and when laid underground shall have a uniform thickness of one-quarter of an inch; when placed above ground, said pipes shall have a uniform thickness of one-eighth of an inch. Where the building is over 60 feet high above the curb, pipes of the following weights shall be used, with extra heavy fittings:

- 2-inch, 5½ pounds per lineal foot.
- 3-inch, 9½ pounds per lineal foot.
- 4-inch, 13 pounds per lineal foot.
- 5-inch, 17 pounds per lineal foot.
- 6-inch, 20 pounds per lineal foot.



7-inch, 27 pounds per lineal foot.

8-inch, 33½ pounds per lineal foot.

10-inch, 45 pounds per lineal foot.

12-inch, 54 pounds per lineal foot.

SECTION XVI. All drain, soil, waste, vent, and supply pipes shall be as direct and concentrated as possible, protected from frost and readily accessible for inspection and convenience in repairing. When necessarily placed within partitions or in recesses in walls, soil, and waste-pipes must never be covered except with woodwork, said woodwork to be so fastened with screws (never nails) as to be readily removed.

SECTION XVII. Every vertical soil and main waste-pipe must be of cast or wrought iron, and must extend at least two feet above the highest part of the roof or coping, except in the case of flat-roof tenement houses, in which case it shall extend at least six feet above the roof, and said pipe shall have a diameter above the roof at least one inch greater than the pipe proper, but in no case shall it be less than four inches in diameter above the roof. No cap or cowl shall be affixed to the top of such ventilation pipe, but a strong wire basket shall be provided and securely fastened thereto. Each length shall be securely fastened, and in the case of each line of soil-pipe it shall rest at its foot on a pier or foundation to prevent settling. All joints in cast-iron drain, soil, or waste pipes must be so filled with oakum and lead and hand-caulked as to make them gas tight, and the amount of lead used shall be not less than 12 ounces to each inch diameter of the pipe so connected.

SECTION XVIII. There shall be no traps placed on vertical soil and waste-pipes.

SECTION XIX. All changes in direction in cast or wrought iron pipes shall be made with curved pipes, and all connexions with Y branches and one-sixteenth or one-eighth bends, if possible.

SECTION XX. Soil, waste, and vent pipes in an extension must be extended above the roof of the main building, when otherwise they would open within 20 feet of the windows of the main house or the adjoining house.

SECTION XXI. The least diameter of soil-pipe permitted is four inches. A vertical waste-pipe into which a line of kitchen sinks discharges must be at least three inches in diameter, if receiving the waste of five or more sinks, and shall have 2-inch branches.

SECTION XXII. When lead pipe is used to connect fixtures with vertical soil or waste-pipes, or to connect traps with vertical vent-pipes, it must not be lighter than D pipe.

SECTION XXIII. All connexions of lead with iron pipes must be made with a brass sleeve or ferrule, of the same size as the lead pipe, put in the hub of the branch of the iron pipe and caulked with lead. The lead pipe must be attached to the ferrule by a wiped or overcast joint. All connexions of lead waste and vent pipes shall be made by means of wiped joints.

SECTION XXIV. Every water-closet, urinal, sink, basin, wash tray, bath, and every tub or set of tubs and hydrant waste-pipe must be separately and effectively trapped, except where a sink and wash tubs immediately adjoin each other, in which case the waste-pipe from the tubs may be connected with the inlet side of the sink trap. In such a case the tub waste-pipe is not required to be separately trapped. Urinal platforms, if connected to drain-pipes, must also be properly trapped, and a supply of water so arranged as to always maintain the seal of said traps. In no case shall the waste from the bath tub or other fixture be connected with a water-closet trap.

SECTION XXV. Traps must be placed as near the fixtures as practicable, and in no case shall a trap be more than two feet from the fixture.

Each and every trap shall be ventilated either by a special vent pipe of suitable size, extending at least two feet above the highest part of the house (or into a special pipe erected for ventilating purposes only, in which case the area of the special vent must be increased as it passes upward, so as to correspond to the combined area of all branch vents passing into it).



SECTION XXVI. Traps must be protected from siphonage, and the waste-pipe leading from them ventilated by a special air pipe, in no case less than 2 inches in diameter for water-closet traps and  $1\frac{1}{2}$  inches for other traps. Except in private dwellings, the vertical vent pipes for traps of water-closets in buildings more than four stories in height must be at least 3 inches in diameter, with 2-inch branches to each trap, and for traps of other fixtures not less than 2 inches in diameter, with branches  $1\frac{1}{2}$  inches in diameter, unless the trap is smaller, in which case the diameter of branch vent-pipe must be at least equal to the diameter of the trap. In all cases vertical vent-pipe must be of cast or wrought iron.

SECTION XXVII. Vent-pipes must extend 2 feet above the highest part of the roof or coping, the extension to be not less than 4 inches in diameter, to avoid obstruction from frost, except in cases where the use of smaller pipes is permitted by the board of health. "*Where more convenient, vent-pipes from traps, or combinations of the same, may be connected to the main soil-pipe extension above the highest waste inlet.*" These vent-pipes must always have a continuous slope, to avoid collecting water by condensation.

SECTION XXVIII. No trap vent-pipe shall be used as a waste or soil-pipe.

SECTION XXIX. Overflow pipes from fixtures must in each case be connected on the inlet side of the trap of the same fixture.

SECTION XXX. Waste-pipes from safes under fixtures shall be discharged into an open sink or upon the cellar floor. In no case shall they be connected with the soil-pipe, house-drain, or sewer. The waste-pipe from refrigerators shall in no case be directly connected with any soil or waste-pipe, or with any drain or sewer, or discharge upon the ground.

SECTION XXXI. The sediment pipe from kitchen boilers must be connected on the inlet side of the sink-trap.

SECTION XXXII. Water-closets must never be placed in an unventilated room or compartment. In every case the compartment must be open to the outer air, or be ventilated by means of a shaft or air duct.

SECTION XXXIII. All water-closets within the house must be supplied with water from separate tanks or cisterns, the water of which is used for no other purpose. A group of closets on the same floor may be supplied from one tank. Pan-closets are prohibited, and plunger closets with valve attachments are prohibited, except on special permit from the board of health.

SECTION XXXIV. Water-closets, when placed in the yard, must be so arranged as to be conveniently and adequately flushed and their water supply pipes and traps must be protected from freezing. The compartment of such water-closets must be ventilated by means of slatted openings in the doors and roof.

SECTION XXXV. All waste, overflow, or vent pipes shall be of lead, cast or wrought iron.

SECTION XXXVI. Rain water leaders, when placed inside of any building, must be of cast-iron, with leaded joints; wrought iron screwed joints; or copper, with soldered joints. When outside of the building, and connected with the drain, it must, if of sheet metal with slip joints, be trapped beneath the ground or just inside of the wall, the trap being arranged so as to prevent freezing. In every case where a leader opens near a window or a light shaft, it must be properly trapped at its base. The joint between a cast iron leader and the roof must be made gas and water tight by means of a brass ferrule and lead or water pipe properly connected.

SECTION XXXVII. Rain water leaders must never be used as soil, waste, or vent pipes, nor shall any soil, waste or vent pipe be used as a leader.

SECTION XXXVIII. No steam exhaust, blow-off or drip-pipe from a steam boiler shall connect with the sewer or with any drain, soil-pipe, or waste-pipe. Such pipe must discharge into a tank or condenser, from which a suitable outlet to the drain may be provided.

SECTION XXXIX. Every new plumbing system must be tested by the plumber, by the air, water or peppermint test, in the presence of a proper

officer of the board of health, after the several lines of soil and waste-pipes, with their respective branches, are in place and the lead connecting pieces are attached. All defective joints must be made tight, &c.

SECTION XL. Cellar and foundation walls must be rendered impervious to dampness, and the use of asphaltum or coal-tar pitch in addition to hydraulic cement is recommended for that purpose.

SECTION XLI. Cellars and areas shall not be connected to the house-drain, unless absolutely necessary. If connected with the house drains, running taps with cut off valves and proper water-supply must be provided. Dry cesspools must be used to care for surface water from cellars and areas when practicable.

SECTION XLII. Sub-soil drains must be provided when necessary, and in no case shall these drains have a direct connexion with the sewer or the drainage system of any building.

SECTION XLIII. Yard and open light courts must always be properly graded, cemented, flagged, or well-paved, and properly drained; when the drain is connected with the house-drain, it must be effectively trapped.

SECTION XLIV. Any person or persons or corporation failing to comply with, offending against, or violating any of the provisions of Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, or 43 of this ordinance, shall, on conviction thereof, pay a penalty of fifty dollars for the first offence, and for the second and each subsequent offence the sum of one hundred dollars.

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### The Housing of the Poorer Classes.

BY

THEODORE THOMSON, M.A., M.B., Medical Inspector of the Local Government Board, formerly Medical Officer of Health for Sheffield and for Aberdeen.

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To every medical officer of health, but more especially to him who has charge of a large urban district, the better housing of the poorer classes is an ever-present problem, of which the partial solution is of difficulty sufficient to occupy a large share of the attention he gives to his duties. Such is the magnitude of the task, so great are the various difficulties to be overcome, and, too often, so small is the meed of success with which his efforts are rewarded, that he may be excused if he occasionally allow a feeling of discouragement to overcome him.

It is not that we of the present day house our poor worse than did our predecessors of 50 years ago. On the contrary, comparison of the evidence around us with the evidence handed down to us from the past, shows clearly that in this respect we have improved. Yet one cannot but feel that progress is slow, and that an almost overwhelming task lies before the worker in this field. He who has to deal practically with the subject soon discovers that the poor, with the better housing of whom he is concerned, are so dissimilar, that he makes for himself a rough division of them into two classes, for which, in some respects, different treatment has to be adopted. There is the class constituted by

those whose incomes are small, and to whom the struggle for existence is hard, but who contrive to lead fairly decent and self-respecting lives; and there is the class which comprises the failures of life: the loafer, the criminal, the drunkard, and a few to whom fate has been unkind, and who have thus sunk to a level, for their presence in which, unlike the majority of their companions, they have not themselves largely to blame. The houses of the *first* of these two classes are often fairly comfortable. No one who has much knowledge of the subject is unaware of the fact that the poor, but decent, working man does not usually inhabit a loathsome hovel. But, although the house he occupies may be as I have described it, yet he is badly off in that he pays too much rent. A middle-class person, in the receipt of 400*l.* or 500*l.* a year, would not relish having to contribute a sixth, a fourth, or an even larger proportion of his income for house-rent, as the poorer working man often has to do. And, in large towns, his house, whatever its internal condition, is usually situated in a crowded neighbourhood, and gives little opportunity to the tenant of taking country walks, and breathing the fresh country air. Neither is the poor agricultural labourer to be unduly congratulated on his advantage in this respect over his city brother, for, as a rule, the structural defects of his habitation, which often is a mere tumble-down barn, counterbalance the benefits accruing from surrounding open space. The houses of the *second* of these two classes are of a much worse type in surroundings, in structure, and in internal condition. Closely huddled together, with filth of all descriptions accumulated in the vicinity, damp, dark, and dirty are the houses of the lowest social stratum.

Both at home and abroad, the poor may be roughly classified in some such way as this, and those who deal with the amelioration of their dwellings, find that in the housing of the poorer classes are involved two distinct problems. I do not mean to say that many of the remedies which apply to the evil conditions affecting the one class do not also apply to those affecting the other; but I do hold that, while there are remedies common to both, there is a point at which, because of the very different characteristics of these two classes, divergence takes place in the course to be pursued.

During the past 40 years there has been, at home and abroad, a great deal of legislation bearing both directly and indirectly on the housing of the poorer classes. Such legislation has been very different in different countries; the rate of progression of such legislation, and the manner in which the laws have been put in force, have varied much; and, at the present day, the leading civilised countries are far from having the same legal provisions on this subject. Such meetings as the present serve as a means of bringing together from these various countries delegates who can interchange observations, and who may possibly learn from each other something which may subsequently bear useful fruit. It may well be, indeed, that the legislation which is suitable for one people is unsuitable for another; or that means other than legislative adopted with success for the amelioration of the condition of



the poorer classes in one country are unfitted to succeed with those of another; but some methods, applicable to all, or to more than one, there are sure to be. My own actual working experience has been in England and Scotland only; any knowledge that I possess of the problem as it presents itself elsewhere being that gained as a reader or as an observer, not that of a working official; and, therefore, I shall deal with the question in the aspect which it has had for me as a medical officer of health in this country.

In England and Scotland the health officer has many opportunities of aiding in the improvement of the poorer class of houses by seeing, so far as lies in his power, that the provisions embodied in the various Health Acts, and in the Housing of the Working Classes Act, 1890, are carried out. Many of these provisions are of great utility, and no medical officer who does his duty need feel that he has failed to help towards the betterment of his more unfortunate fellow man. But, if his heart be in his work, he will also feel that he would fain have done more than he has been able to do, and you will find that he is ready to criticise the means he has had at his disposal, to comment on the methods of utilising such means, and to suggest improvements in both these directions. For example, the existing law is not always enforced as it ought to be. This may be the fault of a sanitary authority that has more sympathy with the property owner than with the property occupier; or it may be the fault of the official charged with the care of the public health, who may not sufficiently spur his authority to do its duty. To my mind the remedy for both these defects is the same. The person best fitted to see that a sanitary authority does its duty is the medical officer of health, and if there be a good health officer there is a good guarantee that this duty will be done. But at present there is no certainty that a good health officer will be provided even in the majority of districts in this country; on the contrary, there is a certainty that many unsatisfactory officials will be appointed. For this I do not blame my professional brethren, but rather praise the large number, who, for a nominal recompense, devote, to the detriment of their private practice, a totally disproportionate share of their time to public work. What is to be expected in the way of amelioration of the condition of the poorer classes for 5*l.* per annum? And yet there are districts in which that amount, or even less, and many others in which but little more is paid to the official who nominally supervises the health of the people. Even in those districts where the medical officer of health receives a more suitable salary, a difficulty is placed in the way of his stimulating the sanitary authority by making him liable to be dismissed by them from office at their pleasure. Many health officers, notwithstanding this, faithfully point out to the sanitary authority their duty; but why, I ask, should such a difficulty be put in their way? In Scotland, under the recent Local Government Act, a step in advance has been taken by making the appointment of county medical officers compulsory, and by rendering their dismissal without the consent of the central authority impossible. It is difficult to see why this should not be applied with good effect to England, or to any other country. When one reflects

that the real pivot on which turns the carrying out of the Housing of the Working Classes Act, 1890, is the medical officer of health; that to him, in that Act, constant reference is made; that on him, when possible, is thrown responsibility; that, therefore, according to his capacity or incapacity, his time or want of time, will the Act be efficiently or inefficiently administered; it clearly becomes very desirable that for each sanitary district, or combination of districts, there should be such an official, suitably paid, and not liable to be dismissed at the pleasure of any local body whose apparent interests he may have damaged. With a good staff of efficient and independent medical officers of health, the Housing of the Working Classes Act, 1890, will be put in operation more effectively than any of its predecessors, or than it is itself otherwise likely to be. This want of health organisation I regard as one of the great obstacles to the abolition of the present insanitary dwellings of the poor, and their replacement by more suitable habitations.

But, given a suitable administrative staff throughout the whole country, the question that next arises is whether the laws, under which they would work, are sufficient for the purpose for which they are intended. To this question I think an answer is found in the fact that every year are formulated provisions, which sometimes fall to the ground, sometimes pass into law in private or in general Acts. An example of the difficulties that beset the path of the health officer is found in the 91st section of the Public Health Act of 1875, where the word "nuisance" is so defined as to frequently render it impossible for a magistrate to order the abatement of insanitary conditions. Most health officers probably have discovered that the street sewer may ventilate itself directly into a bedroom without creating a nuisance according to law. Any reader of a sanitary journal will constantly find in its columns similar complaints accompanied by suggested improvements of the existing sanitary laws.

In connexion with the Housing of the Working Classes Act, 1890, arises an important economic question. I have said that the poorer working man pays too much rent for his house. In that Act powers are given to sanitary authorities to deal with unhealthy areas, powers which in some of the larger towns are being utilised, and which will aid in providing more suitable and relatively cheaper dwellings for the poor. Whether it will suffice remains to be seen. He would be a bold man who would maintain that legislation of this class will stop where it now is. The difficulties met with in attempting to properly house the poor are enormous. As things are at present, the poor man has in large towns to live near his work in order to save the cost of daily transit, to economise by dining at home, to be nearer the great provision marts where he can procure cheap food, and to enable his wife and children to find in the neighbourhood of their home some occupation which will eke out his scanty income. Hence results accumulation of poorer labourers near their work with consequent great demand for shelter, and a fictitious value of house property. It is an example of the much-admired law of supply and demand, in which the demander, being heavily handicapped, suffers severely. Is he to have better wages, is

his house rent to be lowered, or are facilities to be given him to live farther from his work? And if so, how are all or any of these things to be done? All these are matters which lie at the root of the question; and the medical officer of health, while he knows that such things are officially beyond his province, yet feels that this health question is really an economic question, and that the true solution is an economic one. In the same way the dilapidated building occupied by the poorer class of agricultural labourers is likely to persist so long as the labourer is in receipt of a wage that does not enable him to pay a rent sufficient to return any interest on the capital necessary to erect a decent cottage. Should his sanitary authority build him a cottage and let it to him at a loss? Or should he have a higher wage, and how is he to get it? Or should he have a land allotment with his cottage to enable him to pay a remunerative rent? These are not questions for a medical officer of health to settle, but the settling of these will do much to settle the sanitary question with which he is concerned.

Something else will have to be done with the lowest class of all. Of these it may be said that were they to-morrow housed in a palace, they would in ten days make it a pig-stye. For them remedies are required other than those needful for the class immediately above them. No doubt they will, despite themselves, to some extent be benefited by sanitary improvements of their dwellings, by demolition of unhealthy areas, by improved lodging-houses under the existing laws. But so long as there is an insanitary building left they will go to it, for they do not admire sanitation. They will avoid all model dwellings, for they do not wish to be cleanly and orderly as there prescribed by rule, and they will destroy and fill with filth any interior that becomes theirs. It is to be hoped that in process of time the benefits of education will effect some improvement in the members of this class, but it must be a long time before these benefits create any appreciable effect. Private effort, such as the noble work of Miss Octavia Hill and others, is one of the means to which one may look with hope. Possibly registration of all the worst class of houses, somewhat on the Glasgow model, with frequent and stringent supervision of the habits of the inmates might be useful. Such supervision would not be pleasant to the inmates; but it is, perhaps, desirable that life should not be made too pleasant for this class of society, most of whom deserve no sympathy other than that which one bestows upon the victims of heredity.

There are some points of my subject into which I have not gone at any length, and others to which I have not even alluded. But the time limit renders it impossible for me to consider every side of a subject so vast; and what I have set myself to do is rather to convey the leading impressions suggested to me by my experience as a medical officer of health. Briefly summarised, these impressions are, that although the present sanitary laws are open to improvement, yet that the most crying present need is not so much change of, or addition to, those as a thoroughly efficient and complete system of health administration by capable and independent medical officers throughout the country; and that the final and complete solution of the problem of how to house the



poorer classes is inextricably bound up with a great social difficulty of which the settling will come to pass, either prior to, or coincidentally with, the settling of that which has been the subject of this paper.

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## The State and the Homes of the Poor.

BY

JOHN HAMER, Hon. Secretary of the Mansion House Council on the Dwellings of the Poor.

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Sanitary reformers all the world over have great cause, *not* "to rest," but certainly "to be thankful," when they review the great advantages which have been gained during the past century. In 1774 the death-rate in London was 48·1, in 1889 it was 17·4. But the progress of science, as applied to the prevention of disease and the prolongation of life, has been vastly accelerated during the last 25 years. Sanitary science owes its position to-day most of all to the fact that the world has begun to perceive that it is to its interest to take care of the people, and especially of the wage-earning classes. Philanthropy assumes a totally different aspect in the eyes of the world when it is able to demonstrate that it pays to keep the people healthy. The health of the people is the wealth of the State, for though it would indeed "be impossible to estimate more than very roughly the loss of money which a community suffers from the loss of wage-earning power during sickness, it needs no argument to show that the amount every year is simply enormous." If this be a mean and mercenary way of looking at the matter it is at any rate one which has enabled reformers to convince mankind that it is better that its workers be decently housed in healthy homes rather than allowed to herd in hovels which become centres of disease and a danger to the whole community. The growth of public opinion as to the value of healthy surroundings is even yet very slow in comparison with the real importance of the subject, and we look with fervent aspiration to the time when society shall have become so permeated by a love of order, a sense of decency, and a proper spirit of independence, that the people themselves shall insist upon "a healthy home" being as much their birthright as the air we breathe or the light we love.

State regulations can do much to improve the condition of the people, but no legislation will make good citizens unless the citizen understands, appreciates, and adopts the laws made. Even when this is done, and the self-government of the people becomes a realised fact, there will still remain certain vital matters which must ever be of national importance, and which cannot be left to local *laissez-faire*. Health and education are two such matters, and their control ought

to be matters undertaken by the State. Ignorance fosters crime, insanitary conditions result in enfeebled manhood, and miserable homes produce and perpetuate a low state of mental and moral health. Co-operation and building societies, which enable the people to acquire their own homes, distinctly raise the level of the working class, and give them a personal interest in promoting sanitation. But even such well-meant methods may be abused, when the greed of the money-maker steps in and defeats the aim of the philanthropist. I believe it is true that one of the largest artizans' dwellings societies in London no longer strives first to get the workman to buy his house, but attaches more importance to paying good dividends to its shareholders. Improved dwellings, especially on the block-system, are by no means an unmitigated blessing, though they do not deserve all the condemnation bestowed upon them. In large towns it would seem to be almost inevitable that such erections should exist, and under proper control they present distinct advantages as to sanitary arrangements, facilities for inspection, &c. Against them the gravest objections are their height; the rooms of some of the best are, on the ground floors, never penetrated by a ray of sunlight, whilst in the very large blocks the terrible catastrophe that might at any time result from a fire is too horrible to contemplate. Practical workers amongst the poor agree pretty much that moderate sized blocks are not disliked by decent people, but large ones, which render even comparative isolation most difficult, are not popular. All attempts at approaching the cottage system, where at all possible, are decidedly to be encouraged. The State can do a great deal by compelling railway companies to run cheap workmen's trains within a fixed zone round every large town, and the unused land frequently held by railway companies might be utilised with advantage for the building of cottages, to which cheap trains would bring occupiers. Here again the State, in the interests of the whole community, should assimilate the Sanitary and Building Acts. Otherwise such anomalies as those we suffer from in London will continue. We sweep away a rookery from Bethnal Green and permit the erection of one little better at South Tottenham. No more striking object lesson could be presented to the members of this Congress than would be seen in the course of a drive from Piccadilly to Edmonton. The entire way, about nine miles, is lined with houses, and outside the metropolitan area, where you ought to come to healthily built houses with the charming surroundings that characterise the country, you find jerry built houses by the score. These are in most cases densely packed, so that the population is already as great in proportion to the area as districts in the East of London which have long been condemned as "slums." If we cannot, like Queen Elizabeth, issue our mandate that no more houses shall be built in London, we can at any rate say that houses, wherever built, shall at least be in accordance with the elementary principles of sanitary science.

It is no part of this paper to deal with political questions. Sanitary reform and the health of the people ought to be far removed from the arena of party conflict. Nevertheless, the ownership of the land will,

unless wisely and prudently dealt with, very soon become a crucial question which may provoke the fiercest passions and lead to the direst results. In our own country the greatest variety exists owing to the differences of tenure. In Leeds scarcely a house is built upon anything but freehold land, whilst in Sheffield and Huddersfield hardly a house is to be found that is not erected on leasehold property at present irredeemable.

Municipal enterprise can do, and has done, a great deal for the people, especially by the provision of lodging houses. Examples are found in Glasgow and Liverpool. But nothing short of central State control can, or should be allowed to, regulate vital necessities of life. Under such control, I would place water-supply, artificial lighting, the provision of open spaces to secure abundant fresh air, and sufficient medical supervision to ensure the stamping out of infectious disease, and the duty of providing against invasions of foreign epidemics. No commercial company ought to be allowed to make money out of a monopoly in the supply of the vital necessities of a healthy home. Decentralise as rapidly as the growing intelligence of the people will permit, but you must always have Imperial control over local authorities if you want to secure the efficient working of the Sanitary Acts. Without such centralised supervision, one locality, by neglecting its duties, may spread an epidemic throughout its better administered neighbours. Medical officers of health should be State servants, responsible to a Ministry of Public Health, and not under the absolute control of property owners constituting the local authority, whether it be a town council or a parish vestry. The sanitary staff of every locality should be of a much higher status, and subjected to the test of proper examination, whilst the pay of medical officers who look after the health conditions of our towns should be higher than at present. It seems incredible that one of the largest districts in London last month advertised for a medical officer of health to superintend the sanitary condition of a population of 120,000, and offered a salary of 200*l.* a year, with the stipulation that he should attend *half an hour each day at the office!* And this is a district quite recently convicted by a public inquiry of the grossest negligence in sanitary administration.

In my opinion, and I speak from some years of personal experience, the soundest policy for the regulation by the State of the homes of the poor is through such a machinery as I have indicated, supported by a more cordial co-operation of all classes in the local government of the country, and by the gradual and persevering education of the people in the duties and responsibilities they owe to each other and to all in the maintenance of cleanly and well-ordered homes.





## On the Housing of the Poorer Classes,

BY

S. M. BURROUGHS, F.R.G.S.

The chief difficulties in the way of the housing of the poorer classes appear to be:—

1. The necessity of living near their work, which leads to congestion in towns and cities.
2. The dearth of land, which arises partly from the same cause.
3. The rates and taxes upon houses.
4. The average inability to pay for good houses among the working classes.

With regard to the first difficulty it could be mitigated or removed by free travel; and while this may appear very Utopian to some people, it is, I believe, easily practicable, and that without robbing anyone for the benefit of others. At the present time travelling is made unnecessarily expensive, as many seats are unoccupied and the cost of selling and collecting tickets and keeping accounts of the same is very great. Free travel of course involves the purchase of railways by the State. They now make average dividends of  $4\frac{1}{2}$  per cent., whereas the Government securities would float at 2 per cent. The saving of interest alone to the public would amount to 10,000,000*l.* per annum. The strongest objection to free travel is, that if it has to be paid for out of the Consolidated Fund, the pecuniary benefit would go chiefly into the pockets of owners of suburban lands. An illustration of this is afforded by the case of the free ferry at Woolwich. This has made the hitherto swampy and useless lands on the north side of the river available for building purposes, and a large rental value has been added to the lands of North Woolwich, which previously possessed no rental value to speak of. These increased values are a great deal more than enough to pay for the cost of the ferry; in fact, the abolition of fares on the ferry immediately increased the value of land in North Woolwich. It is observed that the constructions of toll roads, by making hitherto inaccessible lands available for use, increases their value. If the tolls are abolished the land rises still higher in value. The construction of bridges and freeing them from tolls has a similar effect, and the same would be said of railways if travel were made free. The tendency of free travel is to make land in the suburbs equally valuable to that in towns. It is therefore submitted that it is reasonable and just to tax land values imparted by free travel to pay for the same. If the principle is correct that land values created by the public expenditure should be taxed to recompense the public for the expenditure, it then follows that the cost of constructing roads and streets and sewers and keeping them in order, the expenses of lighting, planting of trees, &c., &c., should be paid for out of the so-called unearned increment upon land which arises on account of public expenditure and the neighbourhood of a civilised community. The taxation of the unearned increment imparted to land by the community would

reduce the selling price of land and thus remove this difficulty. It would also make rates and taxes upon houses and improvements unnecessary, and thus remove the third difficulty. In fact, it would exempt industry entirely from taxation.

Finally the increased employment of labour would advance wages. The transfer of taxation from industry to unearned increment would be of the greatest benefit to the working classes. It would make unprofitable the holding of land out of use, and would at the same time exempt improvements on land from taxation.



### The Sanitary Registration of Dwellings in regard to Drainage and Water-Supply.

BY

H. RUTHERFURD, Barrister-at-Law, Delegate from the Sanitary Assurance Association.



The purpose of this paper is to enforce the view that all dwellings hereafter to be built, and certain classes of dwellings already erected, should be provided—1. With a system of house drainage so arranged and constructed as to guard the inmates from the noxious influence of so-called sanitary appliances: 2. With a protected indoor water-supply, as distinguished from a wholesome supply at the fountain head: and 3. That the dwellings referred to, when so provided, and on production of a sanitary certificate, granted by a competent authority, shall be entered in some official Register.

It cannot be denied that the existing legislative provisions as to *house drainage and water-supply protection* are insufficient to maintain the degree of safety necessary for preserving health; and although other matters appertaining to house sanitation deserve consideration, the two subjects mentioned demand *urgent* attention, and ought to be dealt with more effectively by competent authority. While adequate ventilation of a house, inodorous surroundings, and other matters, are of considerable importance, many of these are largely dealt with by existing law. Further, there is this marked difference between some of these useful requirements and those specially pressed by this paper. Bad ventilation and ill-placed dustbins are *obvious* defects; the purchaser or hirer of a house cannot say that he is misled or deceived, and the maxim "*caveat emptor*" applies. But with regard to faulty arrangements in the domestic closets and waste-pipes, and defective or ill-contrived water-cisterns, the case is different. The offending point may be discoverable only by the observing power of an expert, or may be concealed from every one until revealed by illness, or by the breaking up of a building. The mischief is insidious, and as the emanations from sewer connexions are of serious consequence to inmates of dwellings, it seems only reasonable to draw a distinction between the

open and obvious defect and the insidious approach of a concealed danger, and to urge that, to meet this danger, Government action may be properly invoked.

It is no doubt true that existing law provides that water-closets, or equivalent arrangements, shall be supplied, and that drainage shall be attended to; and it is also the case that under certain circumstances, and after certain formalities, entrance of officials into occupied dwellings is authorised, to ascertain that the necessary sanitary conveniences have been provided. But it does not appear that a *faulty construction of such appliances* can be dealt with, unless the fault is glaring, and the evil therefrom amounts almost to a nuisance to outsiders. In order therefore to enable intending occupiers of new dwellings to be saved from injury, it is essential not only that these should be provided with the usual appliances, but that they should be inspected and pronounced good in themselves, and suitably adapted to those dwellings. For otherwise the mere requirements that domestic conveniences shall be provided almost amounts in many cases to a statutory obligation to undergo illness or suffer death.

In regard to the water-supply, the point now urged is that the water for drinking should be protected after its introduction to the house; for obviously, however good it may be at the fountain head, this is of little advantage if it become affected by pollution within the walls of the dwelling. Protection from this should be insisted upon, both as regards possible contamination by emanations from discharge pipes, and also as regards the position of the drinking-water cistern, so that it shall not be a receptacle for dust, or inaccessible for purposes of investigation and periodical cleaning.

With regard to *existing dwellings*, however, the difficulty of rigorously enforcing such requirements is very great. To insist upon all such buildings being brought at once (even if it were practically possible) to the ideal standard of sanitation, would by reason of the heavy cost and the occasional serious disarrangement of the buildings, prove an unreasonable demand upon the resources of individuals. But it is conceived, first, that without in such case quite approaching the deal standard, a *minimum* standard might be adopted which would still be of considerable sanitary value; next, that this lower standard might be enforced after the completion of a long tenancy or period of years. As to water, however, whatever minimum of house sanitation experts may consider sufficient, I trust it will not be deemed too severe a demand if, as to protection of drinking-water, there should be but one standard. In regard to the use of the word "dwelling" the term is here intended to apply both to residential houses and to all buildings wherein human beings are employed or engaged for any number of consecutive hours. It is not forgotten that the present law, by the Factory and Workshop Acts, the Common Lodging Houses Acts, and others, deals with numerous special cases, and that already some overlapping occurs. But for the purpose of this paper there is much ground that those Acts do not cover, and when such Acts are in effective operation it is not proposed that they should be interfered with by further legislation.



It has been stated that with existing dwellings a different standard of sanitation might be accepted, and time given for its adoption. With regard, however, to certain classes of such dwellings, I would urge that legislation should at once intervene. I refer to the cases of *hotels and lodgings, and to Board Schools and other institutions under local control*. The reason for demanding the sanitation of such existing buildings is that with hotels the public have not always the opportunity of choice; arriving from the country or from abroad, the stranger in a town must go to such quarters as are available, and the very purpose of hotels is to provide accommodation for travellers who of necessity can know nothing of the arrangements of a dwelling within whose walls they may be, under the greatest urgency, bound for a time to reside. And when we know that perhaps at home, and certainly abroad, the traveller's life has been cut short by insanitary conditions of hotels, it does not seem much more unreasonable to demand protection from such evils than to insist that for some hours daily there shall be no sale of alcohol.

*Lodgings*, though not quite in the position of hotels, are included therewith, because where the business is a regular occupation the functions of the lodging-house are very similar, and the position of the guest almost equally defenceless.

*Board schools* are placed in the same category because attendance of the children is compulsory, and they neither know nor care about sanitary arrangements. While, as to the parents, they are probably altogether excluded from an opportunity of inspecting such arrangements, and it is quite possible that even if it were granted, and the condition of affairs was grossly unsatisfactory, the parents would come to the conclusion that, in comparison with their own, the arrangements were salubrious and even attractive.

It may be urged that the compulsory action suggested is, in the case of public institutions, unnecessary and vexatious. Without saying that my experience of such cases is extensive, I can state that instances of a very gross character have occurred. When in very large buildings under the control of a school board the sanitary conveniences had been pronounced faulty and dangerous to health, and several deaths had ensued therefrom, the Board nevertheless failed to take such action as was necessary, and the schools were, after the holidays, reopened on the alleged ground that there had not been time, or it was not then convenient, to carry out the operations so imperatively required.

To an audience of this character it would be in vain to attempt by reciting sensational cases to enlist their sympathies without convincing their reason; but certainly it would not be difficult to illustrate the point at issue by other examples of grievous suffering and distress inflicted upon the young, the weak, or the helpless.

We have now to inquire as to the sanitary *registration* of the buildings referred to. It is conceived that the best mode of enforcing the observance of sanitary regulations is to establish a public register in which to enter a reference to every building which has complied with

such regulations, and to provide that no buildings should be inhabited until so registered.

The registration would be effected on production of a certificate of due sanitation from some competent authority; but inasmuch as the sanitary condition of a house may vary with lapse of time, it is proposed that quinquennially an inspection should be made, and the fact, if all be found in order, endorsed on the certificate. But if any discovered evils should, within a certain period, not be remedied, the house would then at once disappear from the register. In the case of change of tenancy during the quinquennial period, or of structural alterations endangering the sanitary arrangements, it should be obligatory on the house owner to obtain inspection and to notify the result to the sanitary registrar.

In this connexion it would be well to consider whether encouragement should not be given to the voluntary sanitation of dwellings, for the time being excluded from compulsory regulations, by entering them on the register, when duly certified, on such easy terms as to fees and otherwise as might be thought expedient. It is probable that many house proprietors would be willing and eager to conform to such modified regulations with the view of attracting tenants or securing more remunerative rents; the result in either case being to the benefit of society at large.

The question still remaining is that of the person or parties competent to issue the sanitary certificates. While admitting to the full that the educated official persons at present in charge of the public health are competent and desirable authorities to grant such certificates, it is considered that the power in question ought not to be confined to the officials of the State. Sanitary science is still young, and it may be that progress would be more surely made by extending the power to certify to such medical men, architects, engineers, or associations as have themselves or through their staff the recognised diplomas of sanitary knowledge; just as under the Vaccination Act, while the act of vaccination is often performed by official persons, the statute may be complied with through means of other persons, provided they are qualified by diplomas of recognised validity.

It is not denied that some difficulty may arise on this part of the subject, and the limits allowed will not permit of its being fully dealt with; but it may be suggested that the reckless or fraudulent issue of certificates could be met by severe penalties, while the offender would still be left open to the public trial of a civil action for damages at the suit of any injured party.

Lastly, although the measures recommended in this paper may not be heroic, it is submitted that they are worthy of consideration, and that their adoption would to no inconsiderable degree work for the general good. In asking for State interference it must be remembered that we are making fresh invasion on private liberty, and we ought not to extend this invasion further than is absolutely necessary. Also, the theoretical sanitarian is bound to consider what are the prospects of passing an ideal scheme into effective law. The insistence of a very

high standard may lead to immediate failure, and possibly to a disastrous postponement. On the other hand, there can be no doubt that if by the limited scheme here presented dwellings should be provided with appliances of the character specified, examined in their respective positions, and periodically supervised, a great improvement would be conferred upon the habitations of the people. Slow and lingering diseases would be diminished, the tone of the general health would be raised, and something would have been done to increase the happiness of many an individual home.

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DISCUSSION.

**Dr. Pankhurst** (Manchester) said that the Corporation of Manchester had set a good example by applying the Housing of the Working Classes Act to a large area. In applying the powers of the statute difficulties arose, because no place was so bad as not to find some persons willing to live in it. All great cities had insanitary areas. Another difficulty was the cost of acquiring land. Before these difficulties could be overcome administrators must be backed by a greater force of public opinion. He suggested that when an area is cleared, part of it should be covered with model dwellings at nominal rents, but under rigorous rules as to discipline. The worst class of tenants might submit to the discipline if they only paid nominal rents. The remainder of the area should be put up to competition under sanitary restrictions, submission to which might be induced by removing pecuniary burdens. The model dwellings would be imitated in other places, both in construction and organisation. Thus healthy homes would gradually replace existing insanitary houses; the working population living in them would develop increased powers for hard work; their lives would be lifted into a higher condition of independence and morality, on which could be engrafted the excellencies and graces of life.

**Dr. Parkes** (London) said the working classes largely depend on local sanitary authorities for healthy homes. A certain amount of centralization was necessary to control local boards. The controlling authority should be a county council cognisant of local needs rather than a Government department ignorant of them, and likely to regard everything as a matter of numbers and figures to be dealt with according to strict departmental rules. All houses occupied by members of more than one family should be regularly and systematically inspected. This was seldom done because local authorities had not a sufficient number of sanitary inspectors. The courts administering sanitary law should be separate and distinct from police courts administering criminal law, the decisions of which were often unsatisfactory. In London dilapidated houses, when pulled down, were often replaced by huge blocks, where large numbers were crowded into a small space in rooms some of which were shut off from light and air. The Metropolitan Building Acts were insufficient to prevent the erection of these insanitary buildings, which future generations would find very difficult to deal with effectually. The poor population who were driven out from the central districts of London had crowded into badly built houses in the suburbs, and these in a few years would be as bad as those from which the people came. Present powers



were insufficient to remedy this evil, which has only been shifted, not destroyed.

**Mrs. Sheldon Amos** (London) pointed out that the London County Council had decided that blocks of houses should not exceed four stories in height. The difficulty in housing the very poor was increased by their own conduct. Placed in decent houses, they often used the woodwork for fuel, and even tore up the stairs. She thought that medical officers of health were not always reliable.

**Mr. Mark Judge** (London) deprecated too much dependence on officialism, but approved Mr. Rutherford's proposals for the sanitary registration of houses. The system should be applied to all houses, not merely to those of the working classes. Most new houses are erected under the supervision of sanitary officials; old houses are examined by them and sometimes demolished by their direction. The results of their supervision should be recorded. Owners and occupiers complying with their requirements should receive a certificate to that effect. This would protect them against the officials and against changes in the standard of official requirements. The State should see that owners or occupiers properly attended to the sanitary condition of their houses, but the State should not undertake to regulate the sanitary arrangements of every household. This would remove individual responsibility, stereotype imperfect systems, encumber private enterprise, and discourage inventive activity. The sanitary registration of dwellings should be effected on certificates of competent sanitary experts, not on certificates from public officials.

**Mr. Alexander** (London) considered that some of the so-called model dwellings were wanting in many of the provisions necessary for home and family life. He agreed that medical officers of health should be protected in the discharge of their duties, and thought protection should also be given to sanitary inspectors.

**Dr. Elgin Gould** (Washington, U.S.A.) in reply, said that many of the difficulties suggested had been solved in the United States, and he suggested study of the recent sanitary laws and regulations in force in New York. He strongly urged the importance of regular systematic inspections by the sanitary officials instead of waiting for private complaints, and he advocated registration and certification of houses. In New York only a certain portion of a plot could be built upon, and the height of the building was regulated in proportion to the width of the street. Plumbing had to be certified as satisfactory before water could be turned on. The presence of a janitor in all tenemented houses tended to prevent tenants from tearing up woodwork for fuel.

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### The Present State of British Law Controlling the Discharge of Noxious Gases from Manufacturing Processes.

BY

A. E. FLETCHER, F.I.C., F.C.S., H.M.'s Chief Inspector under the Alkali, &c. Act.

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Owing to the great development of manufacturing industry, in recent times, injury to the air has been more and more felt, and especially in districts where are carried on certain chemical trades from which large

volumes of noxious gases are liable to be discharged, gases which are poisonous either to animal or to vegetable life, or to both.

Among such processes may be mentioned those required for the separation of metals from their ores ; the preparation of soda, potash, or the alkaline earths from their components, as found in nature ; the treatment to which animal and vegetable fibres are subjected to prepare them for the various uses to which they are applied ; the preparation of colouring materials ; these, and a thousand other operations which are needed for the production of the countless articles considered necessary to the carrying on of our modern civilised life. In the preparation of many of these a noxious gas forms part of the manufacture, and there is therefore a liability of its escaping into the air. We are greatly dependent on the products of chemical industry for the enjoyment of our daily life, and we cannot afford to stop such manufactures, except in extreme cases, even though they may be the occasion of some amount of pollution to the air around us.

It is recorded that in 1316, in order to purify the air, an edict was passed prohibiting the burning of sea-borne, or bituminous, coal in London, on pain to the offender of having his house pulled down. Modern legislation on air pollution, however, seeks to regulate the offending manufacture, rather than to suppress it. From ancient times rules have been adopted in various localities for regulating certain trades from which noxious exhalations were to be expected ; but the first distinct Act of our Legislature which attempted to control the emission of noxious gases from chemical manufactures was the Alkali Act of 1863. And, as far as I can learn, this was the first legislative Act of the kind in Europe regulating, but not suppressing, the emission of noxious gases from a manufacturing process.

The Alkali Act of 1863 referred to only one noxious gas. Its special object was to restrain manufacturers of soda from common salt from allowing the hydrochloric acid generated by the Leblanc soda process to escape as a gas into the air. This acid was, up to that time, considered mainly as a waste product, to be got rid of as easily as possible. With this object, it was allowed to enter the smoke-flues and pass up the main chimney of the works. In fine, dry weather the acid was carried far away from the factory, and becoming largely diluted with air, inflicted but little perceivable injury on distant vegetation. Generally, however, the moisture in the atmosphere promoted the condensation of the gas ; it was carried down by the rain and caused severe injury to neighbouring plants of all kinds. Trees up to three miles from the works were sometimes denuded of their leaves, and, in a short time, killed ; those at even greater distances were injured. The Alkali Act of 1863 made no attempt to stop the soda manufacture, or diminish the activity of the trade, but, in the belief that hydrochloric acid gas could be condensed, and its passage into the air arrested, it enacted that only a certain proportion of the acid generated should be allowed to escape into the air. This amount was fixed at 5 per cent., or one-twentieth part, of the quantity made. It is difficult to know on what

ground the figure 5 was chosen. In adopting it, the moderation of the legislature has been abundantly justified, for, at present, of all the hydrochloric acid generated in Great Britain and Ireland, rather more than 98 per cent. is condensed, while less than 2 per cent. is allowed to escape.

In the Act of 1863 a second new departure was made. This was the appointment of inspectors with power to enter factories and ascertain, at all times, whether the provisions of the Act were duly carried out. Hitherto the common law was the only remedy to which appeal could be made in cases where damage had been done by the emission of noxious gases into the air. But it was found insufficient, because no adequate restitution could be made in many of the cases where injury was sustained, and because, where several chemical works closely adjoined each other, there was great difficulty in determining which had been the offender.

In many cases a money payment could not possibly compensate for damage done. The growing crops on a farm doubtless have a money value, and when destroyed can be paid for in money, but who shall attempt to compensate the owner of an ancestral estate, an ancient hall surrounded by spreading elms and beech, and oaks of centuries' growth, commanding an extensive view of wooded hill and valley, by paying him the timber value for those trees when destroyed by the acid blast of a chemical work. It is clear that in such a case protection from injury is required, not compensation for injury done. Again, at Widnes, in Lancashire, there are 18 large chemical works closely adjoining one another, all capable of doing similar damage to neighbouring vegetation. It is clear that a farmer whose crops at half a mile distance had suffered injury would find it impossible to ascertain which of the 18 works, or how many of them, had been the authors of the mischief. In a twofold manner, therefore, the common law was found insufficient to afford adequate protection in the cases described. Hence the necessity for the new departure in the Act of 1863. It might have been feared that the inspector of chemical works would be regarded by the manufacturer as a spy, a most unwelcome intruder. This has not been the case. Thanks to the wise method of the first chief inspector, Dr. R. Angus Smith, and the discretion of those who held office under him, their visits have rather been courted than resented. The best of the manufacturers regarded the tests made by the inspector as an additional guard of their interests, a further check upon the correct working of their establishments. The smaller men found that the improvements they were led to make in their apparatus in order to comply with the requirements of the Alkali Act, and the increased care demanded in the manipulations of their operatives led to generally improved working and increased profits. The effort of the inspectors has been to induce the manufacturers to make constant systematic tests themselves of the condition and composition of the waste gases of their works, and not to wait till the inspector's test should show that there was an infringement of the provisions of the Act. The result has been very marked. Whereas in the old time any effort to ascertain the composition of waste gases was



almost unknown, now in all suitable cases gas testing is carried out not only by skilled chemists, but as a matter of routine by the workmen themselves. It may also be fairly claimed as a useful result of action taken by the legislature in compelling the manufacturers to prevent the escape of acid gases by their condensation or otherwise, that in so doing, they have been more able to stand their ground against the opposition brought by rival processes. The primary object of the Alkali Act was to compel the alkali manufacturers to condense at least 95 per cent. of the hydrochloric acid they made. This acid was then considered to be in great measure a waste product. Now it is the main source of profit to those who continue to work the Leblanc soda process. Owing to the introduction of a cheaper method for the production of soda, and its consequent reduction in price, the makers by the older method lose on every ton of alkali they sell, but as by the newer process no chlorine compounds are produced, the older makers recoup their loss, and retain their financial position by the sale of these, which are the derivatives of that hydrochloric acid which it has been the object of the Alkali Act to oblige them to conserve. It may thus be asserted that the result of the Alkali Act has been, firstly, to diminish greatly the escape of noxious gases into the air to the injury of vegetation and of animal life and human health; secondly, to assist the manufacturer in controlling his processes of manufacture; and, thirdly, to aid in educating the workmen by leading them on to habits of precision and careful attention to detail. It was soon seen, however, that though five per cent. of the acid generated in a small work, and well mixed with air might be comparatively harmless to the surrounding country, yet the same proportion of that produced in a large work might be very destructive. Moreover, whether the initial quantity were large or small, the condensation went on with ease until the last portions were reached. The difficulty increased as the residue became smaller, not in relation to the original amount, but to the residual air with which it was mixed. In other words, the irreducible residue should be described, not as so much per cent. of the quantity first operated on, but as being a certain fraction of the bulk of air mixed with it. Experiments made in this direction showed that it was not difficult to reduce the amount of hydrochloric acid escaping in the chimney gases of an alkali work to two-tenths of a grain in every cubic foot of such gases. In the year 1874 an amended Act was passed, requiring not only that 95 per cent. of the hydrochloric acid gas must be condensed and arrested, but also that condensation must go on until not more than two-tenths of a grain of that acid should be contained in a cubic foot of the air or gases finally emitted. Further it was enacted that the best practicable means must be adopted for arresting all other noxious gases given off in the work. No standard is here given of the extent to which this condensation must be carried, but attention is fixed on the means used, which must be the "best practicable." The importance of this clause cannot be overrated, and though it may at first sight be regarded as less precise and binding than a fixed standard, such as formed the basis of the older Act, yet in practice it is found to be all that

can be desired and far more comprehensive than any numerical standard. A numerical and fixed standard, though tight and difficult of maintenance to-day, may to-morrow be slack and insufficient in consequence of the introduction of new methods of manufacture, or greater skill of manipulation. It has been so both with the five per cent. and the two-tenth standards; the average amount of hydrochloric acid now discharged from all the chemical works of the country is less than two per cent., while the fixed limit is five per cent., and less than one-tenth of a grain per cubic foot, while the legal limit is two-tenths. The obligation, however, that a man must use the best practicable means for preventing the escape of noxious gases into the air is an ever-tightening bond, accommodating itself to the varying conditions of the problem. Nor is it a bond which can become too tight or oppressive, for who can deny his obligation to use the best practicable methods for accomplishing the objects in view? Moreover it cannot be made oppressive by the whim of an inspector, for in conducting a prosecution under the Act, the onus rests on him to show that better and more practicable means for accomplishing the end in view exist. His assertion, too, must be maintained to the satisfaction of judge and jury in open court, in face of the defendant's skilled witnesses.

To this point the Alkali Act had reference only to the hydrochloric acid and other noxious gases liable to be discharged from alkali works. It was, however, recognised that these were not the only works from which acid and other noxious gases might escape. In 1881 a new Act was passed superseding those of 1863 and 1874. In this the main provision of the older Acts were retained as regards alkali works, but a number of other works were included, from which the more commonly known noxious gases are liable to be emitted. The works now for the first time included were: Sulphuric acid works, chemical manure works, gas liquor works, nitric acid works, sulphate and muriate of ammonia works, chlorine or bleaching powder works, cement works, and salt works. This has caused a great addition to the number of the works originally brought under inspection. The number of registered alkali works in 1890 in Great Britain and Ireland, was 133, while there are 901 other works registered under the Act.

It is obvious that no list of chemical manufactures can long be complete. Almost before the ink with which it is written has become dry, some new process has been proposed, and yearly, if not almost daily, we need to make additions if the list is to include all. At present an extended schedule has been drawn up, enumerating six new kinds of chemical works which it is thought should be added to the list of those which now come under inspection, and constantly further additions might be made as new processes are brought out.

The difficulty thus found of keeping pace with invention arises from the assumed necessity of enumerating the processes of manufacture which are brought under the provisions of the Act. The same difficulty would not arise if instead of naming the *processes* a list were made of the *substances* which are considered noxious, and whose emission is to be kept in check. The Act indeed need take no cognisance of the

manufacture if only control be kept over the substances liable to be discharged from it. These noxious volatile substances or gases are not numerous. The following list of eight will be found to include all that are commonly met with: the acid compounds of chlorine, of fluorine, of sulphur, and of nitrogen, chlorine, sulphuretted hydrogen, metallic fumes containing lead, antimony, arsenic, or zinc, and dust or visible fume, as that from cement works.

A Noxious Gases Act, with such a schedule, would be found to include all the works now under the Alkali Act and all works of a similar nature liable to be established. Nor would it be necessary to fix a numerical limit of the amount of each substance that may be discharged into the air; it would be sufficient to enact that the best means must be adopted to prevent such emission. Perhaps one ground for avoiding this comprehensive classification of noxious gases, and for continuing the effort to name separately every manufacturing process from which such gases might emanate, has been the necessity of charging an annual registration fee on the owner of every work coming within the purview of the Act. The difficulty, however, exists perhaps more in the legal mind than would be found in practice, and the necessity of exacting a registration fee, on which the difficulty rests, has been disputed by many.

It is now 28 years since the passing of the original Alkali Act, and it may be said that the experience of its working has fully borne out the intentions of its framers. For the purpose of its administration the country is divided into seven districts, each being in charge of an inspector. The whole staff being under the superintendence of a chief inspector. It has been found necessary to institute but few prosecutions for contraventions of the provisions of the Act, the effort being to prevent such infractions by activity on the part of the inspectors. No notice is given of their visits, which may be made either by day or night.

If experience has shown the necessity for any amendment in the Act it is only in the direction already indicated, namely, that of rendering the schedule of works which come within its scope more comprehensive by naming the noxious gases which it is desired to control, rather than by specifying the processes of manufacture in connexion with which these gases are liable to be emitted.





## Les Falsifications des Produits commerciaux et les Mesures internationales pour leur Répression.

PAR

Le Dr. P. F. VAN HAMEL ROOS, (Amsterdam.)

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Voici ma première thèse :—

- 1°. *Il y a lieu—eu égard aux falsifications observées dans les divers pays—d'exprimer le vœu qu'il s'établisse une entente internationale visant la répression des falsifications des articles commerciaux en général.*

Tout le monde est d'accord que les gouvernements doivent s'entraider pour la répression des fraudes ; on a discuté cette question au Congrès de la Haye, de Bruxelles et de Vienne, et néanmoins, tout convaincu que l'on soit de la nécessité de cette entente internationale, tout bienveillant que l'on soit dans les différents Congrès pour se promettre une aide réciproque—rien ne se crée par rapport à cette question si importante.

Il serait injuste de ne pas reconnaître que des lois ont été promulguées pour la répression *nationale* des falsifications, depuis que les Congrès ont fixé l'attention sur ce point, et la “Revue internationale des Falsifications” que je dirige, prouve ce qui depuis bientôt cinq ans a été fait dans cette voie. Mais en lisant cette même Revue on doit se dire : comment se peut-il, qu'il y ait presque partout des lois sévères contre les fraudes alimentaires et que pourtant il y ait tous les mois des falsifications observées, soit en Amérique, ou en France, ou en Allemagne, ou en Italie, etc. etc. ?

Au Congrès de Vienne, où j'avais l'honneur de traiter aussi le sujet des falsifications, j'ai comparé les produits falsifiés aux pauvres Bohémiens dont personne ne voulait dans son propre pays, mais que les divers gouvernements essayaient d'envoyer aux frontières voisines. Je crois qu'une grande partie des falsifications résultent de tels envois réciproques—non par les gouvernements bien entendu !—mais par les commerçants malhonnêtes qui se garderaient bien de vendre leurs produits malsains dans leurs propres pays, vu les lois, mais qui sont très peu soucieux s'il s'agit de la santé des étrangers et qui ne se gênent pas, même d'empoisonner quelquefois lentement les gens qui ont le malheur de se trouver hors leurs frontières. Il va sans dire qu'il y a en outre malheureusement encore assez de falsificateurs de profession qui, non contents du gain illicite des exportations, tâchent de faire écouler leurs produits dans leur pays même. L'audace de ces fraudeurs est quelquefois sans pareille et ils essayent tout pour dérouter les chimistes et experts. En voici un exemple. Il se présenta, il y a quelque temps, un soi-disant “fabricant” de farine que me dit, être la dupe de mauvaises pratiques de concurrents qui prétendaient que sa farine était falsifiée. Il me donna un échantillon qu'il avait préparé lui-même—donc il était sûr qu'il n'y avait que du froment dedans, ce qu'il voulait prouver par

mon analyse. Mon examen démontra qu'il y avait de la farine de riz en grande quantité. *Le falsificateur n'avait pas crû que l'examen pourrait déceler la farine de riz* et la prétendue mauvaise pratique et la sûreté qu'il donnait de l'avoir fabriqué lui-même, n'étaient qu'un prétexte pour dépister le chimiste ! Mais en dehors des cas de falsifications dont la base est le gain illicite, mon expérience, assez longue dans la matière, m'a fait connaître des faits qui n'ont rien à faire avec la fraude et qu'il est extrêmement important de citer, puisqu'il s'agit de la protection du commerce honnête. Cette question m'amène à ma seconde proposition :

2°. *Il est désirable que les divers gouvernements fassent rédiger un code indiquant la composition normale des articles commerciaux en général et des substances alimentaires en particulier. Ce code devrait dans chaque pays servir de base aux jugements pour cause de falsification. Les divers gouvernements s'obligeraient à se tenir au courant de ces codes et des changements qu'il serait nécessaire d'y apporter.*

Quelques exemples suffiront pour démontrer la nécessité absolue de cette mesure. Prenons le lait : Le lait qui est considéré en Hollande comme suffisant quand il renferme 11.5 % de matières solides et 2.5 % de graisse, est jugé falsifié aux États-Unis qui n'acceptent que 12 à 13 % (selon la saison) de matières solides et 3 % de graisse. Le vin qui contient plus de 2 gr. de sulfate de potasse par litre est considéré comme falsifié en France, tandis qu'il y a à l'étranger des vins à plus de 2 gr. qui ne sont pas refusés. Je pourrais citer encore le beurre concernant la teneur en eau, caséine et sel ; le chocolat concernant sa teneur en fécule, en sels inorganiques (potasse) et en sucre ; le poivre, etc. ; mais je crois que ces exemples suffisent pour démontrer qu'un marchand honnête, en exportant les marchandises jugées normales dans son pays, peut s'exposer au danger de la confiscation de ses marchandises et risquer son honneur en exportant dans les pays, où les vues des chimistes sont autres que dans le sien.

Si un *Codex alimentarius*, rédigé par une Commission compétente et dûment élue par les divers gouvernements, était adopté dans tous les pays, ces faits—déplorables sous tous les rapports—seraient tout à fait impossibles, puisque les marchands pourraient se convaincre d'abord si telle ou telle marchandise serait acceptée ou non dans le pays en question. Ces commissions auraient, il est vrai, une tâche très difficile, mais pourtant il me paraît que leur travail pourrait être facilité d'une manière considérable, en profitant des analyses de tant de produits déjà publiées de chimistes compétents. Quant à l'organisation d'une telle commission, je crois qu'elle devrait être composée en partie de chimistes de médecins, de juristes et d'ingénieurs. S'il y avait lieu on pourrait demander l'avis de fabricants sérieux des différents produits pour rester dans les limites de l'équité envers l'industrie. J'ai proposé au Congrès de Vienne l'institution de laboratoires, soit aux frontières, soit aux docks pour la répression des fraudes. Mais guidé par mon expérience des dernières années, je crois que cette mesure, *la seule que je considère efficace*, doit être précédée de la composition du dit code que chaque

nation pourrait rédiger selon ses propres idées et les circonstances locales qui, sans aucun doute, ont une grande influence sur la composition des produits. Il va sans dire que ce code pourrait être amendé et additionné, s'il y avait lieu.

L'idée d'une tel code a été émise déjà en 1876 par le Conseil supérieur d'Hygiène en Belgique "qui a recommandé la rédaction d'une " instruction devant servir de guide aux administrations communales, et " indiquant à la fois la composition normale des substances alimentaires " et les moyens les plus faciles pour en constater l'altération et la falsification."\* Ma proposition tend à généraliser cette idée pour tous les peuples, afin de servir vraiment de base à une entente internationale efficace, mais sans prescrire aux savants les méthodes, puisque je considère le vrai principe libéral dans la science : respecter toutes les opinions sérieuses et basées sur des faits bien constatés.

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#### DISCUSSION.

**Dr. Abbott** (Boston, U.S.A.) said that the law which regulated offensive trades in Massachusetts dated from 1697, but had been amended from time to time. The duty of enforcing it devolved primarily on the local authorities, but if they failed to act the State Board could proceed independently. The first object of the law was to assign places where offensive trades could be carried on. The present law of Massachusetts relating to food and drugs dated from 1882. Samples were examined by the State Board. The law required that three-fifths of the appropriation of \$11,500 (£2,300) should be spent in enforcing the law relating to milk and milk products. The principal articles (besides milk and butter) found to be falsified were spices, syrups, honey, cream of tartar, vinegar, molasses, and maple sugar and its syrup. Most of these were commercial frauds, not harmful adulterations.

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#### The Extent to which the State should exercise Control in the Interest of Public Health over the Sale of Poisons.

BY

G. DANFORD THOMAS, M.D., Coroner for London and Middlesex.

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On reference to the Report of the Registrar-General for 1889, I find that 15,025 persons died during the year from what are termed violent deaths, and that of this number 636 were from the effects of poison; excluding authentic cases of suicide, which number 260, there are left 376 cases of death arising from poison, classified as occurring from accident or negligence. The various poisons recorded as causing these deaths were arsenic, mercury, lead, copper, lunar caustic,

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\* Voir Revue internationale des falsifications (Amsterdam) 2<sup>e</sup> Année, p. 194, article de M. D. A. van Bastelaer.



ammonia, caustic soda, caustic potash, phosphorous, sulphuric acid, nitric acid, hydrochloric acid, carbolic acid, carbonic acid, turpentine, paraffine, opium, laudanum, morphia, cordial, soothing syrup, paregoric, chlorodyne, alcohol, chloral, atropine, belladonna, iodine, prussic acid, oil of almonds, cyanide of potassium, aconite, colchicum, strychnia, nux-vomica, cocaine, antipyrine, Steedman's powders, and Burnett's disinfectant; and besides these, a few deaths were attributed to the eating of fungi, poisonous weeds, and poisonous fish.

The records of the coroner's court would reveal, in detail, exactly how and under what circumstances these deaths occurred, and how, when, and where, and in what form the particular poison causing each death was obtained and taken. Such records are well known to medical men, and, therefore, unnecessary to be repeated in detail here. Most of these poisons have been taken in mistake for something else, or taken as overdoses of medical preparations the dangerous contents of which were unknown to the consumers. Despite the regulations and precautions which, to a certain extent, are imposed in this country by law on the sale of poisons, the would-be suicide manages to obtain what he wants in one way or another, and even, indeed, if effectually hindered in this method of self-destruction, would readily find some other means to accomplish his object. But, as I have mentioned, the larger number of deaths from poisons are classified as from "misadventure"—using the word as opposed to a suicide or the wilful act of some other person. In some instances, "neglect," not necessarily of a criminal character, may rightly be attributed, either to the deceased person himself, or to the careless act of someone else. In the same year (1889) 63 deaths occurred where the kind of poison was not stated. As far as the large majority of *deaths* from poison is concerned, we can obtain fairly reliable facts and statistics; but it is impossible to even estimate the large number of persons who may suffer either from acute or chronic poisoning, who may recover or who do not die from the immediate effects of the poisonous drug. Hospital records would reveal a considerable number, but to this must be added those which every medical man in practice encounters from time to time.

It is well known that some of the poisons in the list I have given are contained in many of the proprietary and so-called patent medicines and nostrums, which are largely sold to the public, who procure and consume them without any knowledge of what they contain. It is true that, on analysis, many of these are found to contain harmless ingredients, but a large number of them contain "concealed poisons," such as morphia and the various preparations of opium, prussic acid, antimony, and other poisonous drugs as found in chlorodyne, black drop, soothing syrups, some balsams and elixirs, teething powders, &c. Even in so-called blood mixtures, arsenic and iodine of potassium have been discovered in quantities capable of producing poisonous results. Dr. Hubbard, in his excellent pamphlet on "Homicide as a Misadventure," says, "Disasters not inaptly termed 'runaway knocks at death's door' are constantly occurring, the most frequent of which is profound coma for many hours. These have no public register; they are only recorded

on the "tablet of the memory" of the members of the family in which "they occur, and in the diaries of medical men."

Having briefly referred to the deaths and cases of poisoning that arise, in so many instances, from preventible causes, I would draw attention to the sources from which these poisons are obtained, and the facility with which many of these are sold and purchased; and then, after mentioning the existing regulations affecting the sale of poisons in their naked and concealed forms, as permitted in England, I will endeavour to suggest what further regulations might, with advantage, be adopted in this country as a means of lessening the mortality from poisoning, and reducing the dangers to health and life, which now exist from the indiscriminate sale of proprietary and other medicines containing "concealed poisons." There are three Acts of Parliament regulating the sale of poisons. The Arsenic Act, 1851, and two Pharmacy Acts, 1852 and 1868 respectively. These Pharmacy Acts contain two schedules of poisons, and when a poison contained in either schedule is sold, it must be labelled with:— 1. Name of article. 2. The word "poison." 3. The name and address of the seller; and, in addition to this, when any poison in Schedule I. is sold, there must be an entry made in the poison book as to: 1. Date of sale. 2. Name and address of purchaser. 3. Name and quantity of article. 4. Purpose for which it is wanted; and further, it is not to be sold unless the purchaser is known to, or introduced by, some person known to the seller. The following are the lists of the poisons contained in the schedules referred to:—

#### SCHEDULES OF POISONS.

##### Part I.

Arsenic, and its preparations; aconite, and its preparations. Alkaloids:—all poisonous vegetable alkaloids and their salts; atropine, and its preparations; cantharides; corrosive sublimate; cyanide of potassium, and all metallic cyanides and their preparations; emetic tartar; ergot of rye, and its preparations; prussic acid, and its preparations; savin, and its oil; strychnine, and its preparations; vermin killers, if containing poisons.

##### Part II.

Almonds, essential oil of (unless deprived of prussic acid); belladonna, and its preparations; cantharides, tincture, and all vesicating liquid preparations of; chloroform; chloral hydrate, and its preparations; corrosive sublimate, preparations of; morphia, preparations of; nux-vomica, and its preparations; opium, and its preparations; and preparations of poppies. Oxalic acid; precipitate, red (red oxide of mercury); precipitate white (ammoniated mercury); vermin killers, containing poisons as in schedule.

Now it will at once be seen that there are a large number of poisons not included in the above lists, and these can be purchased without restrictions from anyone who likes to sell them. For example, carbolic acid, nitric acid, hydrochloric acid, sulphuric acid, phosphorous (as rat

poison), can be procured at most chandlers' and oil shops, from one pennyworth upwards, by any person, of any age; and they can be sold, and often are, in any kind of vessel—ginger-beer bottle or teacup—without cork, label, or indication of any kind as to the nature of the contents. Poisons bought in this way cause a large number of the deaths from poisoning, classified under the headings of misadventure and suicide. I should mention that the wholesale dealers are exempt from the operation of these Acts, so that any quantity of poisons could be procured through them without restrictions. A photographer told me that he had only to send his boy to the wholesale house, and he could obtain as much cyanide of potassium as he wanted, without any difficulty. Besides then, the chemist and druggist, the Chandler and oil-shop keepers, who sell poisons, there are about 13,600 tradesmen in Great Britain (other than those mentioned) consisting of grocers, linendrapers, general storekeepers, and others who are dealing in mysterious and secret medicines, many of them containing poisons, the nature and property of which are absolutely unknown to the vendors. In the year 1888 there were in Great Britain 21,600 licences taken out for the sale of patent and proprietary medicines. Comparatively speaking, there are very few *patent* medicines. The composition of a really *patent* medicine is known, and can be seen at the Patent Office. The *proprietary* medicine is a secret preparation, and hence preferred by the owner; but both bear Inland Revenue stamps, and are vaguely termed by the public "patent medicines." Over 200,000*l.* was realised by the Government last year from the sale of medicine stamps, and about 6,000*l.* for licences to sell. These figures will give some idea of the extent of the sale which takes place annually in Great Britain, in secret remedies, and it is also a painful record of what charlatanism and quackery are able to achieve in this so-called enlightened age. How far, then, should the State interfere as regards the health of the people in the sale of poisons, and of secret medicines containing poisons? In making regulations, care has been taken not to hamper the requirements of trade, and, bearing this in mind, I would respectfully submit that even if much stricter regulations were enforced, the purchaser, whether wholesale or retail, would not be subject to one-half the restrictions he has to submit to if he desires to remove a cask of wine or spirits from a bonded warehouse at the Docks.

As an amendment to the Pharmacy Acts I would remove such poisons as morphia, laudanum, chloroform, nux vomica, belladonna, and chloral-hydrate, corrosive sublimate, from the second to the first list of poisons, and all those poisons already mentioned that can be procured at the oil-shops should at once be placed in List No. 2, so as to ensure their being properly labelled as directed by the Act. I would further make it compulsory that all such liquid poisons should be sold in a distinctively coloured bottle, and that no one under the age of 16 years should be served at all. Such regulations would inflict hardship upon no one. With regard to the sale of proprietary and secret medicines containing poisonous drugs, I would have the contents clearly expressed on the label, and the word poison added as required in the sale of such poisons under the present Acts.



Let us see what the Japanese are doing in this matter. They have established a public laboratory for the analysis of chemicals and patent medicines. The proprietors are bound to supply a sample, with the names and proportions of the ingredients, directions for its use, and an explanation of the supposed efficacy. During the year 1889 there were no fewer than 11,904 applicants for licences to prepare and sell 148,091 patent and secret medicines. Permission for the sale of 58,638 different kinds was granted, 8,592 were prohibited, 9,918 were ordered to be discountenanced, and 70,943 remained still to be reported on. The majority of those authorised to be sold were of no efficacy, and but few were really remedial agents. The sale of these was not prohibited, as they were not dangerous to the health of the people.

In *Italy*, only as recently as January 1st of the present year, the sale of secret remedies became subject to the following regulations:—The composition, as to the quality and quantity of the active substances contained must be written on the labels and on the advertisements; no special therapeutic virtue or indication shall be attributed to them either on the label or advertisement; they shall be sold only by chemists under the vigilance of the sanitary authorities and with medical prescriptions.

In *France* the pharmacier is forbidden to sell secret remedies or even to keep them on his premises under heavy penalties.

In *Germany* the chemist may sell patent medicines, when ordered by the prescription of the physician. He must not sell secret remedies. All patent medicines sold by the chemist must be prepared under special supervision, and according to the rules of the pharmacopœia.

In *America* the law varies in each State, but speaking generally much reform is needed.

Other nations seem in advance of Great Britain in the interests of the public health as regards the precautions taken in the sale of poisons and of secret medicines containing poisonous drugs. We might wisely in many respects follow their example.

I have one further suggestion to make as regards the sale of secret remedies. I would make all proprietary medicines really *patent*. I would abolish licences to sell them, and I would confine the sale to chemists and druggists only.



#### DISCUSSION.

**Dr. Littlejohn** said that from his long experience as surgeon of police in Edinburgh he concurred in the conclusions of Dr. Danford Thomas, and cordially agreed that further legislation was necessary. He strongly disapproved of the unrestricted sale of laudanum among all classes of the community.

**Brigade Surgeon McGann** (delegate from the Government of Mysore, India) drew attention to the great loss of life occasioned by the unrestricted sale of poisons in India, and the total absence of any enactment to check this.

**Mr. Carteighe** (President of the Pharmaceutical Society of Great Britain) said that from his official position he had much information on

this subject, and in the public interest he cordially agreed with Dr. Danford Thomas's conclusions. The Pharmaceutical Society had found great difficulty in carrying out their powers under the Pharmacy Acts. There were so many ways of circumventing the Acts that it was often almost impossible to prevent the indiscriminate use of statutory poisons. Whilst pharmaceutical chemists only sold laudanum, &c. under certain conditions, a street huckster might sell any quantity if it were mixed with treacle or some other harmless material. Since the passing of the Act, the sale of statutory poisons had diminished, but that of quack medicines containing poison had increased enormously. It was well known to medical men that increased restrictions on the sale of alcohol were followed by an increased demand for nostrums containing poison, an additional reason why Dr. Danford Thomas's suggestions should receive the attention of the Government.

Dr. Danford Thomas proposed, and Dr. Littlejohn seconded, the following *Resolution* :—

“That in the opinion of this Section of the Seventh International Congress of Hygiene and Demography it is essential in the public interest that the existing law regulating the sale of poisons should be amended, and greater restrictions placed on the sale of poisons generally in all countries, and especially in Great Britain, India, and the British Colonies.”

This was *carried* with one dissentient.

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### Thursday, 13th August 1891.

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The Chair was occupied successively by—

Dr. F. W. BARRY (London), and;

Dr. THORNE THORNE (London).

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On recent Proposals relating to Burial and Cremation, and the Importance of Disinfecting all Bodies Dying from Infectious Disease; with Remarks on the Present System of Certifying the Cause of Death.

BY

Sir HY. THOMPSON, F.R.C.S., M.B. Lond., Consulting Surgeon to University College Hospital, Vice-President of the Sanitary Institute, Honorary Member of the French Society of Hygiene, and of the Royal Italian Society of Hygiene, &c., &c.

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I propose to assume, in order not to occupy unnecessarily your valuable time, that there can be little or no difference of opinion regarding the accuracy of the following proposition :—

That the bodies of those who have recently died by any or almost any of the diseases generally known as “zymotic,” and thus classified by the Registrar-General in this country, are charged with elements which have the property of communicating the same diseases to the bodies of living persons, if brought into contact with them, whether by inoculation or by food-admixture.

The group of diseases defined as “zymotic” is generally held to be formed chiefly by the following:—Small-pox, measles, scarlet fever, diphtheria, whooping-cough, typhus, enteric and continued fevers, with some forms of diarrhoea, and cholera.

In considering the mortality from these diseases, occurring under ordinary circumstances in this country, it will be desirable, first, to state what is the mortality arising from all causes, and then to ascertain the proportion which the group in question bears to the total.

The official reports of the Registrar-General for the last three years will show this, extracts having been prepared for the purpose. No special outbreak took place, and the average was rather lower than had previously been recorded.

The number of deaths from all causes in England and Wales during the last three years is as follows:—

*Deaths in England and Wales* during 1887, 530,758=18·8 per 1,000. [*Estimated population*, 28,247,151.] Among these, “zymotic,” or specific febrile diseases, amounted to 75,205.

Of these 530,758 deaths, the causes of death were uncertified in 17,465 cases, or 3·3 per cent. (Fiftieth Annual Report of Registrar-General.—London: Eyre and Spottiswoode. 1888, pp. x, xii, xvi.)

*Deaths in England and Wales* during 1888, 510,971=17·8 per 1,000. [*Estimated population*, 28,628,804.] Among these, “zymotic,” or specific febrile diseases, amounted to 60,166 cases.

Of these 510,971 deaths, the causes of death were uncertified in 15,747 cases, or 3·1 per cent. (Fifty-first Annual Report of the Registrar-General.—London: Eyre and Spottiswoode. 1889, pp. viii, x, xvii.)

*Deaths in England and Wales* during 1889, 518,353=17·9 per 1,000. [*Estimated population*, 29,015,613.] Among these “zymotic,” or specific febrile disease, amounted to 69,776 cases.

Of these 518,353 deaths, the causes of death were uncertified in 15,100 cases, or 2·9 per cent., a smaller proportion than in any preceding year. In Wales it was larger than in any other locality, being 5·9 per cent. In Middlesex it was smallest, being only 0·7 per cent. (Fifty-second Annual Report of the Registrar-General.—London: Eyre and Spottiswoode. 1890, pp. viii, xviii, xix.)

*Deaths in Scotland* during 1888, 71,174=19·6 per 1,000; from zymotic diseases, 7,974.

Of these 71,174 deaths the causes of death were uncertified in 5,029 cases, or 7·1 per cent., but in very varying proportions in different localities.



Thus, in Edinburgh, they were 10·1 per cent. of the total number.

Glasgow	„	4·1	„	„
Aberdeen	„	1·6	„	„
Greenock	„	5·7	„	„
Shetland (island of)	57·6		„	„
Counties of Ross and				
Cromarty	-	42·9	„	„
Inverness they were	32·9		„	„
Stirling	„	4·9	„	„
Dumbarton	„	3·4	„	„
Peebles	„	2·2	„	„
Selkirk	„	1·9	„	„

{Thirty-fourth Annual Report of the Registrar-General in Scotland.

—Edinburgh: Neill and Co. 1890, pp. xxvi and lvi.)

It thus appears that the mean mortality from zymotic diseases during the last three years amounts to 68,382 per annum in England and Wales alone. Of this large proportion, namely, more than one-eighth of the total mortality, it must be pointed out that each case was not merely a focus of infection while living, but was capable of actively propagating disease after death. At that period this activity is at its maximum; becoming less from various chemical changes which follow their natural course afterwards, largely, no doubt, through oxidation from exposure, the nature of some of these changes not having yet been completely studied and ascertained.

For the sake of the living and healthy population, the question of rendering those dead by zymotic diseases innocuous, is one of supreme importance. The nearly 69,000 foci of communicable disease scattered annually throughout our country cannot fail to extend injurious influences to others. It is not too much to say that this large number of deaths from maladies which are mostly preventible is itself partly due to the fact that the dead body is permitted to propagate disease to the living. Could we arrest at once and completely the injuriously active forces which pervade it, a marked diminution would be apparent in the progress of many a local pestilence.

Questions touching the isolation of cases during illness, their sanitary condition, and the employment of disinfectants during life, have hitherto largely occupied the public as well as the medical profession; and their study has been followed by remarkably successful results. Illustrations of these it will be wholly superfluous for me to adduce. The management of infectious disease during life is not within our scope to-day. The question here before us is,—“What is the best mode of arresting the progress of infection when death occurs, so that diseased remains shall not injure the living, whose right to protection is now the all-important consideration?”

A long experience has demonstrated that all methods of dealing with the dead body, which have for their object its conservation entire when it is charged with infectious elements, permit these to be disseminated, and have often occasioned fresh outbreaks, especially in periods of epidemic

visitation. The intricate, continuous, and universally pervading natural network of watercourse beneath the surface of the soil, associated as it is with innumerable artificial wells, reservoirs, and channels of every description for distributing water and collecting sewage, form a system unseen, yet scarcely imaginable in regard of its extent, by those who have not practically studied it and realised the complexity of its ramifications. In a densely populated country this system presents, perhaps, the most formidable social health problem which the sanitarian has to encounter.

The history of the chief epidemics of the last 60 years in this country, and of the local outbreaks of fever, diphtheria, scarlet fever, small-pox, &c., offer innumerable examples of propagation and extension of these diseases, due mainly, if not entirely, to the failure to prevent poisoning of the watercourses, not only by excreta during life, but by dead bodies committed to the soil:—bodies which are deposited there solely in obedience to a sentiment that it is necessary to preserve the integrity of their form and the unaltered condition of their elements;—elements at that moment so destructive and so mobile.

I have no need to dilate on these facts, their fatal influence is a part of our national history.

On the other hand, I shall not ignore the fact that diseased bodies may, in certain soils, in exceptionally favourable situations, be deposited with the object just named, and that in the course of three or four years, perhaps, the chief danger may be dissipated without ascertainable harm to others. Extreme precautions must always be taken to preserve the encroachment of population on these favoured spots, or no hope of their harmlessness can be maintained.

Then in these light, dry soils and elevated spots, the most salubrious, by the way, that we possess for human habitation (for which purpose, so long as they are used as burying-grounds, they are totally disqualified) it may be feasible to adopt interment in perishable coffins or in close contact with the soil itself, and thus to ensure a quicker process of decomposition of the body than occurs in heavier soil, or when it is confined in the more solid coffins hitherto employed.

But it ought never to be forgotten that the perishable coffin, if safe in exceptional circumstances, becomes most dangerous in burying-grounds where any communication exists with the great network of watercourses described, and always associated with populous districts. It is during the early weeks or months which follow death, that the poison of the diseased body is at its maximum, both as regards force and quantity. You open wide the doors for the exit of such infection when you bury that body in a basket or in a perishable envelope. Better even in the interest of the living that you placed it in the much abused lead coffin, offensive as the results of changes which take place in these sealed interiors are—when opened. For we have at least the right to doubt whether specific morbid germs survive for many years the remarkable organic transformation which slowly takes place within the lead coffin.



All, then, that I contend for is this: that, whatever form of dealing with the dead you adopt which demands as its primary condition the preservation of the body entire, some risk to the living is associated therewith. That risk may be minimised by certain precautions, but its amount is only a question of degree. It may be formidable, and produce lamentable results when interment is intra-mural—as many living witnesses can testify, since it was a custom not many years ago universally followed.

It is less considerable, but is often manifest, in confined suburban districts, and particularly where the central concourse of inhabitants is a rapidly increasing one.

The risk and its results are obvious in many country churchyards, especially in low-lying districts, on the borders of rivers and water-ways,—naturally, for manifold reasons, the favourite haunts of population. Such situations form, in fact, the sites occupied by the largest part of our rural inhabitants and by almost all our towns.

Finally, the risk is small when confined to outlying uninhabited districts with a peculiarly favourable soil. But who shall say when the minimum of risk at present there existing shall not in our populous country become manifestly greater?

Now in regard to the nearly 69,000 bodies dying of zymotic diseases, let it be observed that few of these are within reach of a choice and almost safe locality. On the contrary, they are scattered throughout the kingdom, and the majority are necessarily interred in places where the germs of disease can be readily carried into the currents of the great water systems referred to. With these existing facts before us, we have moreover to provide for an increasing population and for increasing occupation of the land best adapted for the purposes of habitation.

I have recently proposed therefore that the body of every person that has died of zymotic disease should be at once absolutely disinfected—rendered incapable of extending it,—that is, as soon as possible after death, having due regard to convenience and decorum.\* I know only one mode of effecting this object, namely, by submitting the body to a sufficiently high temperature. Placed in a chamber heated to something like 1,500° F., about 800° C., all the fluid and gaseous matters are volatilised and escape as innocuous gases. The residue is a heap of dry white ash, absolutely harmless. An hour suffices to complete the operation, and it is in fact a process of complete desiccation and disinfection by heat. When the process is conducted in a furnace it is popularly spoken of as “Cremation.” The method above described, however, constitutes the best and simplest way of accomplishing the end proposed, there being no contact with burning fuel or applied flame. I adopted it as an experiment for the first time as long ago as in 1874, by means of a Siemens’ furnace, and thus reduced a body containing a large proportion of adipose tissue, and weighing about 110 kilogrammes, in less than an hour, the pure

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\* “Modern Cremation,” 2nd edition: by Sir H. Thompson, pp. 126, 7.



white ashes weighing less than two-and-a-half kilogrammes.\* The cost of the proper apparatus, and the necessity for a full supply of gas by which the heat is obtained, compelled the Cremation Society of England at first, following the example of the society at Milan, to employ a reverberatory furnace, the most approved form of which is now adopted at Woking, and with admirable results.† But the remarkable success which has followed the society's operations renders it probable that before long the system now referred to will also be in operation and conducted under their auspices.

It is this process of *disinfection by high temperature* that I now propose should be applied to all bodies certified to have died of infectious disease, as an act of wise precaution and just regard for the interests of the living.

There is one other course which might be followed, less trustworthy than the preceding, but infinitely more so than burial in the most favourable soil. This is the use of a capacious coffin, embedding the body therein with a large quantity of quicklime, so as to fill the receptacle completely, and then burying in the usual manner.

I now arrive at the latter and subordinate section of my paper, the subject arising necessarily and logically from what has gone before.

In contemplating the gradually increasing preference for cremation to burial which is being manifested, especially among the educated classes both in this country‡ and abroad, and particularly in view of the proposal to desiccate and disinfect by heat certain diseased bodies, which I advocate here to-day; it is essential to demand, at the same time, that the official determination of the causes of death should in all cases be more complete than it has hitherto been in this country. I refer you to the extracts from the Registrar-General's reports to show that in England and Wales some 15,000 deaths occur every year—about three per cent.—the causes of which have not been investigated or certified by any person. In Scotland the proportion is far larger. Even in the city of Edinburgh the uncertified deaths in the last report issued amounted to no less than 10 per cent.

Fully qualified medical men—a Medical Officer of Health, for example, is now to be found in almost every locality, with a district under his supervision—should be appointed so as to embrace the entire urban and country populations. His duty should be to examine and certify in every case of death, making an autopsy where desirable, determining whether a coroner's inquest is necessary, and certifying when he is

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\* Particulars were published in the "Contemporary Review," London, March 1874.

† There is now an excellent apparatus in full working at Père-la-Chaise, Paris, recently established: a furnace known as on the "Système Muller-Fichet." It is described in the "Journal d'Hygiène" for June 18 and 25, 1891.

‡ In 1885 cremation was first publicly performed at the Crematorium at Woking, and has been employed ever since with due precautions and solely under the supervision of the Cremation Society of England. Above 200 bodies have thus been successfully dealt with.

completely satisfied that death has occurred from natural causes. When this officer has thus certified, cremation is to be permissible. Lastly, he should advise, and in time may probably be empowered to enforce, after death by infectious disease, the use of quicklime, as above described, in districts without a crematory, or the process by heat where one exists.

In France, Germany, and other continental nations, an appointed examiner has long exercised the function described. In this country a certificate of death is given by the medical attendant of the deceased, if there be one. In many instances there is none; or the attendance has been insufficient to supply evidence of much value, and the duty is often discharged in a perfunctory manner unless a coroner's inquest is held, when the cause of death is carefully investigated.

I have said nothing relative to the employment of exposure to high temperature or cremation as a desirable process after death in *all cases*, instead of interment in earth. But it is impossible to resist the belief that the former would be preferable from a sanitary point of view. The argument which appears to me wholly irresistible in relation to bodies deceased from infectious diseases is only by some degrees less weighty in regard to death by all other causes. Putrefying animal matter is always noxious, and may be dangerous to the living; the process of desiccation and disinfection in earth must in any case occupy years for its accomplishment, and during the first period of the term much harm may arise. The unseen and lengthy process of putrefaction in the grave is one the details of which are too revolting to be illustrated by any verbal description. On the other hand the action of heat speedily converts the constituents of the body, healthy and diseased alike, into innocuous gases which escape without trace of smoke, odour, or offence, into the atmosphere, and into the white earthy ash already described. The atmosphere yields these gases at once to vegetable growths which increase by absorbing them.

Finally, by this means two great advantages are secured to the public.

*First.* A diseased dead body is rendered incapable of communicating any malady to the living.

*Second.* The assignment of large and desirable tracts of land throughout the country for the imperfect and sometimes hazardous process of purification by burial in earth is rendered needless. Every acre hitherto thus devoted may in process of time be made free for the production of food; or in thickly populated neighbourhoods, as open spaces for exercise and recreation, may be set apart for ever to promote and maintain the public health.



## The Rational Disposal of the Dead : A Plea for Legislation.

BY

FRANCIS SEYMOUR HADEN, F.R.C.S., &c.

The object of this paper, I may say at once, is to contrast the safe and rational disposal of the dead prescribed to us by Nature with the unsafe and irrational method of burial which we practise, and with the equally unsafe and wholly unnecessary practice of cremation. Since, however, it is not possible to deal with so large a question within the short time at our disposal, I have no choice but, by a series of short propositions having a general bearing upon the subject, to present the case to you in its mere outline, and then, by such a reference to one or more of those propositions as time will permit, to found on that reference a plea for legislation. The propositions in question are :—

- (1.) That the natural destination of all organized bodies that have lived, and that die on the earth's surface, is the earth.
- (2.) That the evils which certain theorists would have us believe to be inseparable from the principle of interment, are independent of that principle and of our own creation.
- (3.) That the source of these evils is to be found, not in the burial of the dead, but in the unreasoning sentiment which prompts us to keep them unburied as long as possible, and then to bury them in such a way that the earth can have no access to them.
- (4.) That the principle of burial supposes the resolution of the body by the agency of the earth to which we commit it, and that the earth is competent to effect that resolution, and to effect it innocuously.
- (5.) That to seek to prevent the beneficent agency of the earth by inclosing the dead in imperishable coffins, brick graves, and vaults, is in the highest degree irrational, since it engages us in a vain resistance to an inevitable dispensation, and has led us to accumulate in our midst a vast store of human remains in every stage and condition of decay.
- (6.) That the remedy for such evils is not in cremation, but in a sensible recognition of, and a timely submission to, a well-defined law of Nature, and by legislative action to enforce the provisions of that law.

I propose to-day to deal with the fifth and sixth of these propositions only, and, that the connection of these two with the conclusions arrived at in this paper may be the more apparent, to remind you in the first place of the following facts :—1st. That so long ago as 1840, in consequence of the disclosures then made to them of the shocking state of the city graveyards,\* the Government of that day issued a commission to enquire

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\* Walker on Graveyards. Longmans, 1839.



into and report upon the subject.\* 2nd. That this commission, under the title of "The Board of Health," sat for 14 years, and that, by the end of the first three, it had examined into and reported upon the whole system of cemeterial management as carried out by ourselves and by the rest of Europe. 3rd. That although, in making that examination, it must have come under the notice of the members of this commission—and that again and again—that the coffins in use in every country but our own were of a comparatively light and perishable nature—mere orange boxes in fact in comparison with those we use—the fact, nevertheless, seems to have made no impression upon them, since, in the report they issued, no reference is made to it. 4th. That in connection with this fact, while seeing on all parts of the continent burial grounds far more ancient than our own which had yet preserved their natural level, while ours had become raised many feet by the accumulation of the bodies within them—the connection in question, pregnant as it was with matter for reflection and suggestion, is not even referred to in the report they made, and therefore that no conclusions are sought to be founded on it. 5th. That although they both saw and reported that no Government but our own entrusted so important a matter as the burial of the dead to private persons—still less to undertakers, joint-stock companies, and owners of ground interested in finding room in it for as many corpses as possible, and in enclosing those corpses in the costliest possible envelopes—they yet in their report formed no conclusions and made no recommendations on the subject; and that in suggesting the closure of the old and the opening of similar burial grounds outside the town, they leave the administration of those new burial grounds an open question. 6th. And finally, that the Government of that day in opening the new cemeteries in the stiffest clay, and in stipulating that they should not come within a specified distance of the town, forgot apparently that there was nothing to prevent the town from coming up to the new cemeteries, and, as a consequence, that one of the worst of these cemeteries, containing as it already does, unresolved 155,000 corpses in an unadvancing state of putrefaction, is now the centre of a populous and fashionable district, and that every day of the week makes a sensible addition to the horrible quotient.

It was under these circumstances that we began to hear of cremation. Now I need, I hope, scarcely say that I attach the fullest credit to any public-spirited suggestion intended to deal with so great an evil. What, however, I must say here of that suggestion is, that it was not a right suggestion, and that it was put altogether out of court by the incident which I am about to describe, and in consequence of which, as the advocates of cremation very well know, we heard no more of it for years; and then only, again, because it became evident the Government meant to do nothing.

The event in question—which put an entirely new face upon the matter, and which, though still ignored and unacted upon, is destined one of these days to relieve us of a heavy burthen, and our national

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\* Chadwick, Edwin, C.B., on *Interment in Towns*. W. Clowes, 1843.

intelligence of an equally heavy reproach—was this: In 1875 it had become necessary to level Holborn Hill, and to effect this to make a clean cut through the whole thickness of the adjacent burial ground of St. Andrew's, which at that point had become raised by the accumulation of bodies within it as much as 18 feet above its original level. That ghastly section it was my lot to see and examine. I have elsewhere described it.\* It is therefore unnecessary to say more of it here than that, having been made from above downwards, and from east to west, it had exposed in their full length both the bodies of the dead and the coffins which contained them, and, that, in the exact positions they had occupied for two centuries and a half. It was also noticeable that very little, if any, soil had been allowed to remain between any two coffins, so that, as these coffins were in close apposition, each body within them had become invested with a double casing of wood. What, however, was most noticeable was the fact that both the bodies themselves and the coffins that enclosed them were, as to decay, in much the same state as when they were first buried—in a state, that is to say, of an unadvanced and unadvancing decomposition, and, even as to this, that little or no difference was observable between the interments of yesterday and the interments of Charles II.'s time. On what, therefore, I found myself in the position of having to ask myself, did a fact in every way so remarkable depend? It was not in the nature of animal matter to remain thus unresolved. All nitrogenous matters were and must be so resolved when buried within the earth. What had we here then to account for a state of things in every way so abnormal? And then it was, and not till then, that I remembered that wood was a non-nitrogenous body, and, this being so, that it would not undergo disintegration when thus buried;† and, this reflection being supported by finding the very sawdust which had been used for filling in the coffins also unchanged, it was, I found, impossible to resist the conclusion that it was the hermetical enclosure of these perishable bodies in coffins that were themselves imperishable, which had arrested their decay and prevented their resolution; in other words, that it was we ourselves, by the unintelligent practice in which we were engaged, that had brought about this terrible accumulation; and, such being the case, that it rested with ourselves—and that at any moment we pleased—to undo the mischief we had done.

But if, as I think I have now shown, it is the imperishable coffin which is the *material* cause of so much mischief, the *moral* cause of it—I regret to have to be so outspoken—is the unreasoning sentiment which prompts us to keep our dead unburied till its use becomes a necessity.‡ Why, I again ask—the terrible cost considered—do we persist in such a habit? Why does the law, so stringent on this point

\* Haden, Francis Seymour, F.R.C.S. Three letters to the *Times*, January 12, March 13, and June 16, 1875. Reprinted by Macmillan.

† The deal planks on which our earliest forefathers were buried are still found in a sound state in Nottinghamshire.—*Antiquities of Myddle*.

‡ Haden, Frances Seymour, F.R.C.S. "A" paper read at the Church Congress at Manchester, October 3, 1888."



in other countries, permit us to do it? The signs of death are now too well known to be mistaken by anybody. One of these signs—the *rigor mortis*—is within the recognition of anyone, and it is within the easy comprehension of everyone that it is the subsidence of this state of rigidity which is the commencement of putrefaction; and, again, that it is this commencement of putrefaction which necessitates the hermetical enclosure referred to. Obviously, therefore, what is here wanted is legal prescription—that gently imperative guidance which we all look for and find to be such a relief under circumstances which impair for a time our own proper judgment, and which at the hands of a paternal Government I say we have a right to look for. It is quite a mistake to suppose that such action would be resented. There was a *consensus* of opinion in its favour when I first wrote upon the subject,\* and there would be again, the moment it was seen and understood that the Government was in earnest in the matter. Meanwhile, I hope I may be forgiven—and if I am not it matters little since I shall so soon be called upon to illustrate my own theory—if I venture to say that I know nothing more characteristic of the kind of government we enjoy than that the announcement of a state of things at once so little creditable to our intelligence, so injurious to our interests, so obvious as to its cause, and so easy as to its remedy, should, for 15 years, have been so entirely ignored as to have produced nothing better than the “memoranda” which are still issued by the Local Government Board† for what I fear I can only call improper and insanitary burial, and the unnatural, unnecessary and dangerous proposals of the advocates of cremation.

Meanwhile, the only genuine effort which has been made to deal with that form of demoralization which more or less prevails in every house on the occasion of a death, has been that inaugurated by my able and energetic friend, the Rev. Mr. Lawrence, of Weston Vicarage, York In the Church of England Funeral Reform Association, of which he is the founder, we have a strikingly sustained instance of such an effort, and it is with the greatest regret that I now see so excellent a movement in some danger of disruption. Such danger however exists, and, if I may be permitted to say so, has arisen out of a well meaning but mistaken attempt on the part of its supporters to make it a *sanitary* as well as a mere movement *ad bonos mores*. For such an extension of their original scheme they must pardon me if I say that they were not prepared, and that by education and habits of thought they are unfitted. The attempt, in fact, has opened the door for the introduction among them of theories, the mischievous character of which they were not at first able to perceive, and with which, now that they have perceived it, they are unable to cope—I mean the inroad on their councils of the cremationist and the use he has made of them for the extension of his propaganda. I very much fear that, unless by a frank return to their original programme (which was merely one for the simplification of funerals and the discouragement

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\* *Times* Leading Articles, January 12, February 2, and June 17, 1875.

† “Memorandum on the Sanitary Requirements of Cemeteries. Local Government Board, 1888.



of excess in the direction of paraphernalia), they can purge themselves of this lethal element, and so restore this otherwise excellent movement within clerical limits, it may suffer shipwreck.

I now approach the last, and perhaps the most discouraging part of the subject with which I have undertaken to deal—cremation. I have already shown that in the case of proper burial it is uncalled for, and in the case of improper burial but the substitution of one evil for another. I now say, in addition to this, that *it is a direct and potent incentive to crime*. Every one knows how often murder—especially murder by poison—has been brought to light by the exhumation, even after long periods, of the buried body, and everyone must also know how impossible such detection is when that body has been driven by the furnace into space. I am not permitted, it appears, by the rules which govern the production of these papers, to repeat here what I have said upon this part of the subject elsewhere; yet it is only by iteration and reiteration that any impression, either for good or for evil—and it matters very little, I am sorry to say, which it is—can ever be made on what is called popular opinion, which, in fact, is not “opinion” at all. Those who remember how horrified we all were at the first mention of Home Rule, and who see how easily that treasonable alternative sits on our consciences now, will bear me out in this, and will understand how it is that, being denied the use of this effective weapon, I have no choice but to appeal and re-appeal to the Government to expose and dispose, at once and for ever, of the whole so-called “argument” in favour of cremation. They can do it if they please as readily as they disposed of the dangerous, but far less dangerous, use of explosives. A simple return of the number of exhumations rendered necessary for the detection of murder within the last 25 or 30 years will prove, I undertake to say, abundantly sufficient for the purpose. I respectfully call upon them for information on the subject.

Meanwhile, what *is* the argument in favour of cremation? It is based, so far as I can see, chiefly on statements which depend for their intended effect on a simple misuse of language and on the effect of that language, not on the popular intelligence, but on the popular ear. In the *Nineteenth Century*, of last May,\* we have an example of such language in its quintessence. The buried body, the cremationist had already told us, does not, as I say it does, re-enter the atmosphere to contribute to its renewal and to the nourishment and growth of plants, but depends for its resolution “at least in an equal degree” (I use the very words of “an expert” called in by the cremationist element on the Council of the Church of England Funeral Reform Association to warrant their rejection of my views on the subject) it depends at least in an equal degree on the action of microbes, which action the public understands as a ghoul-like form of cannibalism on the part of these novel agencies; and they are largely assisted in this belief by finding in such a popular article as that to which I am directing your attention, these lowest forms of vegetation described as “creatures,” “leaping” and “darting” on their “prey,” &c., precisely as if they were endowed,

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\* “The Realm of the Microbe.”

in what are also called "their habits," with something like volition. Well, I entirely acquit the charming and gifted writer of this article of anything more than a desire to popularise the study of bacteriology; but I do not acquit the apostles of cremation of a readiness to profit by such writing, and, by not repudiating it, of leaving on the mind of the uninitiated the impression that the human body committed to the earth is really subjected to such assaults, and of so creating a prejudice against its proper burial and in favour of cremation. As well might it be said that the visible propulsion forward of a crystal in a saturated solution, or of the frost upon the window-pane, is evidence of animal life and of a predatory instinct. Nor, though I make no pretension to be an expert myself, can I bring myself to believe that these unpretending saprophytic little fungi, so useful on the surface, are likely to be found at all as much as four feet below the surface, which it will be remembered is the minimum depth prescribed by the Local Government Board for the interment of adults.

In conclusion, I can only repeat my conviction that what is wanted is not a Bill to regulate cremation—which, on the contrary, *as a measure of public safety*, ought rather to be once declared illegal—but a Bill to regulate and ensure *safe and proper burial*; which Bill to be effectual should also, I think, besides dealing with the whole subject of cemeterial management contain the following provisions:—

- (1.) For burial within the earth as the only legal mode of disposing of a dead body.
- (2.) For a limitation of time beyond which it should be illegal to keep a dead body unburied.
- (3.) For the illegality of strong coffins, brick graves and vaults, and of all contrivances having for their effect to retard resolution, and to confer on the dead a tenure, practically illimitable, of the soil which is necessary to the purposes of the living.

And I would even go further, and venture to affirm that such a Bill, besides being a measure of great social, economical and sanitary importance, would be a positive and grateful relief to everybody.

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### La Crémation en France, 1889-91.

PAR

GEORGES SALOMON, Ingénieur, Secrétaire Général de la Société  
Française de Crémation.

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J'ai exposé au dernier Congrès International d'Hygiène qui s'est tenu à Paris en Août 1889 les grands faits relatifs à la crémation en France entre le moment où la révolution française prenait l'initiative du rétablissement de cette antique coutume, et le jour où je prenais la parole (1797-1887). Cet exposé est contenu tout au long dans les

précieuses annales formées par les comptes-rendus des travaux des Congrès internationaux d'hygiène, dans le tome précédant immédiatement celui qui s'élabore à Londres en ce moment ; il me suffit donc de mettre, à ce jour, la question au point. À relater ainsi les faits accomplis dans notre pays, nous fournirons peut-être quelque enseignement utile à ceux qui militent de toute part, en faveur de la crémation.

### 1. RÈGLEMENTATIONS.

Les dispositions libérales du règlement d'administration publique du 27 Avril 1889 que réglemente l'exercice de la crémation aux termes de la loi sur le liberté des funérailles du 15 Novembre 1887 n'ont entraîné aucun des dangers ni des inconvénients que les adversaires de la crémation avaient prédits.

Aucune réclamation, aucune doute n'a été soulevé sur les causes de la mort à la suite des incinérations effectuées à Paris jusqu'à ce jour. Il suffit, on le sait, en vertu de ce règlement de faire une demande au Maire de la localité du défunt et d'y joindre un certificat du médecin traitant, attestant que la mort est due à une cause naturelle. À défaut de ce certificat—il n'y a pas toujours médecin traitant—le médecin assermenté délégué par le Maire est chargé de procéder à une enquête sommaire dont il consigne les résultats dans le rapport qu'il a toujours pour mission de présenter.

Une circulaire ministérielle du 25 Mai 1890 a déterminé les conditions relatives au transport des corps destinés à être incinérés à Paris. Cette circulaire rédigée sur avis du *Comité consultatif d'hygiène publique de France* est aussi conçue :—

“ Dans l'état de nos mœurs, il a paru que le respect dû aux morts ne permettait pas de retirer le cadavre de la bière pour le livrer nu aux flammes et qu'il convenait de brûler, avec le corps, l'enveloppe qui le contient.

“ Il importe, en conséquence, dans la confection des cercueils qui seront introduits dans le four crématoire, ainsi que dans le choix des désinfectants, d'écarter certaines matières, dont la combustion présenterait des dangers ou des difficultés spéciales.

“ Les expériences qui ont été faites ont démontré qu'il convenait de ne point livrer aux flammes diverses substances dont l'emploi a été prescrit pour le transport des corps par M. le Préfet de police dans son instruction du 1<sup>er</sup> mai 1860 relative aux opérations concernant les décès. Ces substances sont : le bois de chêne, le plomb et un mélange pulvérulent composé de tan et de charbon. En effet, les cercueils en chêne fort ne brûlent que difficilement en laissent comme résidus des braises qui se mélangent avec les cendres.

D'autre part, le plomb des cercueils soumis à la température élevée du four crématoire forme avec la silice des briques un composé chimique qui amène la destruction rapide du four. Enfin, la poudre de tan et de charbon pulvérisé peut former à la chaleur un mélange détonant et amener une explosion.



Il y a lieu de prescrire deux séries de mesures devant être prises les unes au domicile mortuaire, les autres au monument crématoire.

1°. *Au Domicile Mortuaire.*—“Le corps sera placé dans un cercueil en bois léger, de préférence en bois de peuplier et, à défaut de bois de peuplier, en bois de sapin, de bouleau ou d’aulne.

“Les dimensions de ce cercueil ne pourront excéder les mesures suivantes : longueur 2 mètres, largeur 0<sup>m</sup>, 60, hauteur 0<sup>m</sup>, 50. Les parois intérieures de ce cercueil seront badigeonnées au goudron : cet enduit devra être appliqué de façon que les joints soient rendus bien étanches. Le cercueil sera garni intérieurement de toile caoutchoutée ou de carton bitumé en un seul morceau et plié de telle façon qu’il en résulte une sorte de cuvette bien étanche capable de retenir les liquides qui s’échapperaient du corps. Le vide entre le corps et la telle caoutchoutée ou le carton bitumé sera comblé par une des substances absorbantes suivantes : poudre de tourbe, déchet de coton, sciure de bois. Ces substances seront introduites par couches et chaque couche sera légèrement imbibée d’une solution phéniquée forte : la totalité du liquide employé ne devra pas dépasser 400 grammes.

“Si le transport du corps doit avoir lieu à une distance moindre de 200 kilomètres, ce premier cercueil sera renfermé dans une bière en chêne ou en bois présentant une solidité égale : les parois auront 25 millimètres d’épaisseur ; elles seront assemblées à vis, de façon à pouvoir être démontées rapidement : elles seront consolidées au moyen de deux frettes en fer vissées.

“Si la distance à parcourir est de 200 kilomètres et au-dessus, le premier cercueil en bois léger sera enveloppé dans un cercueil confectionné avec des lames de plomb de 2 millimètres et demi d’épaisseur et parfaitement soudées entre elles. Le cercueil en bois et celui en métal seront entièrement indépendants l’un de l’autre.

“Le cercueil en plomb sera renfermé lui-même dans le cercueil extérieur en chêne ou en bois dur dont il vient d’être fait mention.

2°. *Au Monument Crématoire.*—“Le corps devra être incinéré dans les vingt-quatre heures qui suivront son arrivée dans le monument crématoire.

“Si le corps est enfermé dans une triple enveloppe, on dévissera le cercueil extérieur en bois et on placera le cercueil en métal sur une table formée d’une substance imperméable aux liquides.

“Avant d’ouvrir le cercueil en plomb, on y pratiquera un orifice très petit pour donner issue aux gaz, lesquels seront désodorisés à leur sortie.

“On ouvrira le cercueil en plomb de façon à pouvoir en extraire facilement le cercueil intérieur en bois qui sera aussitôt introduit dans le four crématoire.

“Si des liquides s’étaient écoulés hors du cercueil intérieur en bois, on les essuierait soigneusement avec des chiffons imbibés d’une solution phéniquée à 5 p. 100 qu’on brûlerait aussitôt dans un foyer.

Aussitôt après l’extraction du cercueil intérieur en bois, le cercueil en plomb sera désinfecté à fond par le procédé du flambage.

“Seul le cercueil intérieur en bois léger devra être introduit dans le four crématoire. Il en sera ainsi alors même que ce cercueil ne serait point enveloppé de plomb et serait enfermé uniquement dans une bière de chêne ou de bois dur.”

La Préfecture de la Seine a résumé ces renseignements dans une notice qui doit être remise dans les mairies de la capitale lors des déclarations de décès. Jusqu'à présent cette notice destinée essentiellement à appeler l'attention du public sur le nouveau mode de sépulture n'a pas été distribuée avec régularité. Elle expose que les familles sont chargées de fournir l'urne cinéraire. Si l'urne doit être placée dans une sépulture particulière les familles sont libres d'adopter la forme et la matière qu'elles jugent convenables. Si cette urne doit être placée dans un columbarium de la Ville de Paris elle doit avoir les dimensions suivantes :—

Hauteur, 0<sup>m</sup> 28.  
Longueur, 0<sup>m</sup> 48.  
Largeur, 0<sup>m</sup> 28.

Le tarif des incinérations établi par délibération du Conseil Municipal du 7 Août 1889 a déjà été remanié. Nous demandons dans notre rapport au Congrès de Paris que la taxe fut réduite ; satisfaction nous a été donnée. Une délibération du Conseil municipal du 27 Décembre 1889 a établi le tarif suivant :

1 <sup>re</sup> classe	-	-	-	-	-	-	250 f.
2 <sup>e</sup> „	-	-	-	-	-	-	200
3 <sup>e</sup> „	-	-	-	-	-	-	150
4 <sup>e</sup> „	-	-	-	-	-	-	100
5 <sup>e</sup> „	et corps amenés directement de l'extérieur	-	-	-	-	-	50
6 <sup>e</sup> „	-	-	-	-	-	-	Néant.
7 <sup>e</sup> „	-	-	-	-	-	-	
8 <sup>e</sup> „	-	-	-	-	-	-	
Service ordinaire	-	-	-	-	-	-	
„ gratuit	-	-	-	-	-	-	

La tenture du monument crématoire est fournie aux familles par l'Administration des Pompes funèbres, conformément au tarif fixé par décision préfectorale du 20 Avril 1889.

Toute incinération dans les appareils crématoires de la Ville de Paris donne droit à l'occupation pendant cinq ans, si cela est demandé, d'une case dans le columbarium.

À l'expiration de ce délai, l'occupation de la case pendant une nouvelle période au quinquennale sera autorisée moyennant cinquante francs. Si ce renouvellement n'est pas demandé par la famille, les cendres seront déposées dans une tranchée spéciale du cimetière.

C'est là, évidemment, une durée insuffisante. Les partisans de la crémation ont toujours estimé avec raison que, du fait du peu de volume d'une urne, on pourrait la conserver dans le columbarium pendant la durée d'une ou deux générations. De cette façon, l'incinération permettrait au pauvre de pratiquer le culte du souvenir, elle rétablirait

l'égalité dans le mort, elle remédierait aux hontes, aux profanations de la fosse commune.

Le dépôt dans le columbarium n'est pas obligatoire ; les cendres peuvent être inhumées et bien entendu, l'administration ne requiert pas dans ce cas les mesures établies pour l'inhumation des cadavres. Le nombre des urnes que l'on peut placer dans une concession n'est limité que par la place dont on dispose, point n'est besoin d'isoler l'urne de l'air extérieur par une couche de terre d'une épaisseur déterminée. Point n'est besoin non plus de la même superficie de terrain ; un arrêt du préfet de la Seine, en date du 27 Juillet 1890 a établi " qu'il sera " accordé aux personnes qui en feront la demande, des concessions de " 1 mètre au minimum, pour y déposer les urnes contenant les cendres."

On le voit, la crémation aujourd'hui facultative en France n'est entravée par aucune formalité gênante. N'oublions pas que dans certains états les adeptes de la crémation ont été moins favorisés. Ainsi que dans les précédents Congrès internationaux d'hygiène demandons en un vœu solennel que *les gouvernements fassent disparaître les obstacles qui s'opposent encore à la crémation des cadavres.*

Nous avons chaque jour plus d'autorité pour émettre un tel vœu ; chaque jour l'expérience démontre d'avantage l'inanité des objections relatives à la sécurité publique. Et puisque nous nous adressons aux gouvernements demandons leur à nouveau *d'aviser à organiser la crémation des cadavres sur les champs de bataille*, l'utilité de cette demande n'a plus à être démontrée.

## (2.) MONUMENTS.—APPAREILS.

Le monument ou plutôt l'embryon de monument crématoire du Père Lachaise est à peu près dans l'état on l'ont vu les membres du Congrès international d'hygiène de 1889. Au dehors et au dedans ce sont les mêmes murailles nues et inachevées. Ses murailles pourront être décorées, mais on ne pourra pas élargir suffisamment ses salles d'incinération par trop étroites. Le columbarium provisoire établi dans le sous-sol est déjà entièrement occupé. Aussi a-t-on amorcé le long du mur d'enceinte du cimetière proche du monument, le columbarium définitif. C'est un portique de pierre et de fer complètement dénué d'ornementation, capable de contenir 300 cases ; il a 4 mètres de largeur sur 12 mètres de longueur ; son prix de revient est d'environ 18,000 fr. Ainsi adossé au mur d'enceinte, il pourra selon les besoins être prolongé le long du mur. L'administration s'est particulièrement attachée à perfectionner les appareils crématoires. Elle s'est décidée ainsi que nous le demandions à démolir le four à reverbère au bois dit du système Gorini, et Paris possède aujourd'hui deux appareils fondés sur les principe du système Siemens.

L'appareil à air chaud construit par MM. Toisoul et Fradet, et par nous décrit en 1889, a coûté 20,000 fr. alors que le reverbère au bois en a coûté 8,000 fr. ; mais lorsque, comme à Paris, le fonctionnement est continu, la différence des frais de premier établissement est très largement compensée par l'économie du combustible. Les frais de mise en



feu relativement coûteux avec un appareil à gazogène et récupérateur deviennent insignifiants lorsqu'ils sont répartis sur le total des incinérations effectuées en 24 heures. L'appareil Toisoul et Fradet consomme, paraît-il de 11 à 12 hectolitres de coke par 24 heures. La durée des opérations y varie selon les cadavres de une heure à une heure et demie au maximum.

A ses côtés, sur l'emplacement occupé par le four à reverbère s'élève le second appareil du même système dû à M. Fichet, ingénieur civil. Nous ne saurions mieux faire que de reproduire ici la description qui en a été faite par son auteur :—

“ L'appareil se compose de trois parties principales :

Une chambre voûtée dans laquelle s'effectue la crémation ;

Un récupérateur destiné à utiliser la chaleur des gaz sortants à la production de l'air chaud ;

Un gazogène qui fournit l'oxyde de carbone nécessaire au chauffage.

Le chambre voûtée a 0<sup>m</sup> 90 de largeur, 2<sup>m</sup> 50 de long 0<sup>m</sup> 70 de hauteur sous clé. Elle est fermée en avant par une porte en dalles réfractaires montées dans un cadre en fer. La porte s'appuie par son poids sur un encadrement de la devanture en forme de plan incliné de façon à assurer une bonne fermeture. Elle est suspendue au moyen de chaînes passant sur des poulies et équilibré par des contrepoids pour que les mouvements de montée et de descente aient lieu sans effort.

Un écran en tôle est fixé à la porte et se meut avec elle ; il est maintenu à quelques centimètres de distance et un courant d'air circule entre la porte et l'écran. On évite ainsi le rayonnement de la chaleur en avant du four.

Des canaux ont été ménagés dans l'épaisseur des murs pour l'arrivée de l'air chaud venant de récupérateur, et de l'oxyde de carbone et pour le départ des gaz brûlés.

Au fond, à l'opposé de la porte, le mur est percé de trois regards qui permettent de suivre la marche de l'opération.

La sole de la chambre est en pièces réfractaires et creusées de deux profondes rainures qui vont de la façade au fond. Elles sont destinées à loger les bras en fer du chariot d'introduction et de sortie.

A 10 centimètres de hauteur au-dessus de la sole, les murs, latéraux sont garnis d'une série d'orifices qui règnent sur toute la longueur. D'un côté, ces orifices servent à l'arrivée de l'air et de l'oxyde de carbone, du côté opposé, ils servent au départ des gaz.

Ceux-ci se rendent tout d'abord dans une deuxième chambre voûtée semblable à la précédente et placée directement sous la sole. C'est dans cette deuxième chambre qu'aboutit le récupérateur qui est formé d'une série de poteries rectangulaires placées verticalement, et entretoisées de façon à être maintenues à quelque distance l'une de l'autre. Les gaz descendent à l'intérieur des poteries, et l'air s'échauffe

en montant tout autour dans les espaces ménagés au moyen des entretoises.

Le récupérateur est construit tout entier en matériaux réfractaires, d'une pâte dure et compacte, très dense et très cuite. Avant de fermer le four, on a déposé dans la chambre inférieure un peu de sel marin qui, en se volatilisant lors de la mise en marche, est venu former à la surface des pièces tubulaires un glacis qui assure leur imperméabilité. Des dispositions spéciales de joints à glissements ont été prises pour assurer la liberté des mouvements de dilatation, sans permettre le mélange de l'air chaud circulant autour des tubes avec les gaz brûlés qui passent dans leur intérieur.

Des orifices d'admission pour l'air et pour l'oxyde de carbone ont été ménagés dans la chambre inférieure comme dans celle du haut.

Toutes les admissions d'air et de gaz sont réglables à volonté au moyen de registres à crémaillères qui se manœuvrent tous à l'arrière du four, de telle sorte qu'il n'y a aucun service apparent ni sur la façade ni sur les côtés.

On avait observé, dans le four construit précédemment, qu'au moment de l'introduction du cercueil, il se produisait subitement un fort dégagement de gaz enflammés et que la flamme sortait par la porte avant qu'on ait le temps de la refermer ; il nous avait été particulièrement recommandé d'éviter ce rejet de flammes qui avait détruit des tentures et qui produisait sur l'assistance une impression fâcheuse.

Dans ce but, nous avons pratiqué une ouverture dans la voûte près de la façade. Les flammes qui lèchent la voûte passent par cette coupure, et se rendent dans la chambre intérieure par deux cheminées verticales munies de registres, qui ont été réservées dans l'épaisseur du mur d'arrière.

Notre attention avait été aussi appelée sur l'importance qu'il y avait à éviter l'abondant dégagement de fumée qui se produisait pendant une dizaine de minutes au début de l'opération. Nous indiquerons plus loin comment nous sommes arrivés à la supprimer.

Le gazogène fonctionne à la façon des appareils analogues, nous l'avons disposé avec grille horizontale pour permettre en cas de besoin la marche intermittente.

Le tirage de la cheminée se règle au moyen d'un registre pivotant autour d'un axe équilibré au moyen d'un contrepoids. Des renvois de mouvement par chaînes et poulies aboutissent à un levier mobile sur un secteur, placé à l'arrière du four, à côté des autres registres de gaz et d'air, de telle sorte que le surveillant qui observe la marche de l'opération, au moyen des regards du fond, a sous la main tous les moyens de réglage.

*Conduite de l'appareil.*—Pour amener l'appareil à la température convenable, rouge cerise, environ 700° à 800°, on envoie le gaz dans la chambre supérieure où l'on a eu la précaution de faire un petit feu de bois sec. Le gaz s'allume en traversant la flamme du bois, et la flamme descend dans la seconde chambre jusqu'au récupérateur qui ne tarde pas à s'échauffer. Au bout de quelques heures l'appareil étant entièrement chaud du haut en bas, on peut procéder aux crémations.

L'introduction du corps se fait, au moyen du chariot O. André de Piat.

A ce moment, les divers registres sont dans les positions suivantes :  
Celui de la cheminée, largement ouvert.

Ceux de l'oxyde de carbone, complètement fermés.

Celui qui permet l'arrivée de l'air chaud dans la chambre de crémation, complètement fermé.

Celui qui donne accès à l'air chaud dans la chambre inférieure un peu ouvert.

Les deux registres qui mettent la coupure de la voûte en communication avec la chambre inférieure, complètement ouverts.

Examinons ce qui se passe :

Sous l'influence de la haute température des parois, le bois du cercueil s'enflamme instantanément avant qu'on ait le temps de refermer la porte.

La flamme s'engouffre dans la coupure de la voûte et est aspirée dans la chambre inférieure de la cheminée. Là, elle se mélange à l'air chaud en quantité suffisante pour que la combustion soit complète, et les gaz incandescents plongent dans le récupérateur.

Les choses restent en cet état pendant quelques minutes, après quoi le bois du cercueil commençant à se carboniser fournit moins d'hydrocarbures, et le dégagement de gaz devenant moins abondant on peut fermer les deux registres de la coupure de la voûte, et commencer à donner un peu d'air dans la chambre du haut.

Sous l'influence de l'arrivée d'air chaud, le cercueil est percé en quelques instants et, pendant qu'il achève de brûler, l'évaporation des liquides commence à se produire. Pour assurer l'oxydation complète de cette masse de vapeurs, mélangée de gaz organiques, on ouvre en plein le registre d'air de la chambre inférieure et on y fait arriver un peu de gaz oxyde de carbone, de telle sorte que les gaz et vapeurs venant du haut sont obligés de passer dans une flamme oxydante pour se rendre au récupérateur.

L'introduction de l'air dans la chambre inférieure a produit l'effet désiré, et on peu, par ce moyen, éviter complètement la production de la fumée.

La combustion de l'oxyde de carbone dans la chambre inférieure a encore pour effet de maintenir la température élevée du récupérateur qui, sans cela, serait refroidi par le courant de vapeurs.

Au bout de 12 à 15 minutes, la plus grande partie de la vapeur est dégagée, et il faut activer la combustion de la matière organique qui a commencé à se carboniser.

A cet effet, on supprime l'arrivée d'air dans la chambre du bas et on active au contraire l'arrivée d'air par les orifices de la chambre du haut.

L'air chaud insufflé sur le corps par la poussée du récupérateur balaie incessamment la surface charbonneuse maintenue à haute température par le rayonnement des parois de la chambre. Puis cet air, en partie privé de son oxygène, descend dans la chambre inférieure et y



rencontre le gaz oxyde de carbone qui s'enflamme aussitôt ; la chaleur ainsi produite maintient la température du récupérateur.

Tout serait pour le mieux, si la combustion de la matière organique dans la chambre supérieure était assez active pour y maintenir une haute température. Malheureusement, il n'en est pas ainsi, et petit à petit cette chambre se refroidit. Il faut donc, au bout de quelque temps y envoyer un peu de gaz. C'est regrettable, car bien que cette quantité de gaz soit minime. Elle produit toujours un appauvrissement en oxygène, d'où il résulte une prolongation dans la durée de l'opération.

Il aurait été préférable assurément de remplacer la chambre par une moufle chauffée à l'extérieur. Cela n'a pas été possible à cause de l'exiguïté de la pièce destinée à recevoir le four. Elle n'a que 4<sup>m</sup> 50 de largeur et il était nécessaire de réserver des passages convenables de chaque côté de l'appareil.

Comme résultat obtenu, on peut dire que l'appareil est complètement fumivore, et que la durée d'une crémation varie en moyenne entre 45 minutes et une heure.

La quantité de combustible brûlée en 24 heures est d'environ 18 hectolitres de coke, soit 720 kilogr.

Pour ce rendre compte de l'effet utile du combustible, il convient d'en faire deux parts, l'une destinée à combattre le refroidissement par les parois et que l'on peut évaluer à 7 ou 8 hectolitres par 24 heures, l'autre portion, soit 10 hectolitres, est employée à effectuer les crémations pendant 10 heures, depuis 8 ou 9 heures du matin jusqu'à 6 heures du soir, ce qui représente environ 1 hectolitre, soit 35 à 40 kilogr. par opération.

Quand on brûle les cadavres des amphithéâtres de dissection, on en met, comme nous l'avons dit, trois à la fois dans le four. L'opération, dans ce cas, dure une heure et demie, de telle sorte qu'en une journée, sans service de nuit, on peut incinérer 18 corps et faire, en outre, une crémation particulière."

Pour être absolument impartial nous devons dire ici, d'après les renseignements qui nous ont été fournis par les agents de l'administration chargés de sa conduite que l'appareil Fichet n'opère pas plus rapidement que l'appareil Toisoul et Fradet, qu'il na pas supprimé le panache de fumée noire qui s'élève au dessus de la cheminée, et qu'il consommerait 19 à 20 hectolitres de coke par 24 heures là, où l'autre n'en consommerait que 11 à 12. Par contre, il est bien positif qu'il se manœuvre plus facilement et qu'il empêche, fors de l'introduction du cercueil, le rejet de flammes qui émouvait, à la façon de flammes infernales, les personnes sensibles.

### (3.) PROPAGANDE.—OBSTACLES.—RÉFORMES.

Au moment où la crémation fut autorisée et réglementée en France, certaines personnes estimèrent que la société de crémation n'avait plus qu'à crier victoire et à laisser aux municipalités le soin d'ériger des monuments crématoires. D'autres, au contraire, pensaient avec raison

qu'il ne suffisait pas d'introduire une réforme dans la loi pour qu'elle fut appliquée, et qu'avant de disparaître, la société de crémation devait s'occuper de modifier les mœurs, de réagir contre les habitudes, les préjugés, les partis pris en faveur de l'inhumation. Cette dernière opinion a prévalu. En effet, c'est à des groupes, à des sociétés privés et non aux gouvernements ni aux municipalités qu'il appartient de préconiser une réforme qui suscite des objections religieuses.

La société de crémation ne se borne pas à signaler au public par des conférences ou des écrits les avantages de la crémation. Empêchée de pratiquer la crémation, elle veille à ce que les municipalités, seules chargées de cette tâche, la remplissent au mieux ; elle étudie les perfectionnements à apporter aux monuments ou appareils, et les modifications à introduire dans la réglementation en usage. De plus, pour favoriser le mouvement crémationniste elle a fondé une sorte de mutualité. Lorsque le coût total de l'incinération d'un de ses membres (frais de transport, d'opération et autres), est trop élevé pour que la famille y puisse subvenir, la société se substitue à celle-ci avec la discrétion la plus absolue, pour tout ou partie de la dépense. Enfin, si délicate que soit cette tâche, elle se charge d'assurer l'exécution de la dernière volonté de ses membres ; elle rappelle aux familles qui, d'aventure, y contreviennent que la loi sur la liberté des funérailles autorise à en appeler en justice de leur opposition, et établit des pénalités contre toute personne qui dûment prévenue aura donné aux funérailles et aussi au *mode de sépulture*, un caractère contraire à la volonté du défunt.

L'action de la société s'étend sur toute la France, mais, actuellement, la ville de Paris, seule, possède un monument crématoire. La question est sérieusement à l'étude à Lyon et dans quelques villes, mais, il faut le reconnaître elle ne progresse que lentement. À Paris du 1<sup>er</sup> janvier au 31 décembre 1889, on avait effectué 48 incinérations demandées par les familles ; il est vrai que jusque vers le milieu du mois d'août de la dite année, le monument crématoire n'avait été ouvert qu'à titre d'exception, sur autorisation spéciale. Du 1<sup>er</sup> janvier au 31 décembre 1890, ce chiffre s'est élevé à 121, savoir : 65 hommes, 36 femmes, et 20 enfants. Quatorze corps provenaient de la province, les 107 autres appartenaient au département de la Seine. Les résultats des premiers mois de cette année ne permettent pas de prévoir une modification appréciable des chiffres précédents. En 1890, le nombre des incinérations des corps provenant des amphithéâtres d'anatomie a atteint 2,188, et celui des embryons 1,079.

Les hygiénistes français peuvent se féliciter de ce dernier résultat ; peu importe que les cadavres proviennent ou non des hôpitaux, c'est autant d'arraché à la putréfaction, à la pestilence, mais ce n'est pas assez. Ils ont été entendus par les corps savants, là où règne la science règne aussi la raison, ils doivent désormais, dans l'intérêt de la santé publique, objet de tous leurs soucis, se faire entendre par le grand public. Chaque jour un fait nouveau vient les y inciter. Dans le courant de l'été 1890, pour trouver aux morts de Paris, la place qui manque, on a effectué des fouilles au cimetière Montparnasse, dans le lieu où furent inhumés

les cholériques de 1832. Après cinquante-huit années, les corps amoncelés avaient pour le plupart conservé leur forme. On piochait dans un monceau de chair humaine en décomposition. Il fallut au plutôt refermer cet immonde charnier pour éviter l'empoisonnement général. Vers la même époque, en effet, le choléra avait fait son apparition, non loin de Valence, en Espagne, à la suite de fouilles dans un cimetière où des cholériques avaient été inhumés en 1885. Jusqu'à ce jour, les hygiénistes ont apporté un puissant appui aux sociétés de crémation, elles ont milité auprès du législateur, des gouvernements, des municipalités, les vœux des congrès internationaux premier d'hygiène, à la main. Pour que les fruits de cette campagne ne soient pas perdus, il conviendrait que les hygiénistes se fissent spontanément auprès du public, en toute occasion, avec ou sans le concours des sociétés de crémation, les apôtres de cette salutaire pratique. Si singulier que cela puisse paraître, nous serions heureux de voir le congrès convier les hygiénistes du monde entier à un apostolat, au cours duquel laissant un instant de côté les raisons scientifiques qui n'émeuvent guère la foule, ils opposeraient le sentiment au sentiment, la vérité à l'erreur, et même l'erreur à l'erreur ! Les poètes ont chanté l'éternel sommeil au sein de la terre bienfaisante, et ont tressé d'élégantes idylles en l'honneur des champs de repos. Signalons, à l'inverse, les horreurs de la décomposition lente et putride au sein de la terre humide ; exhumons l'être chéri, montrons la grande tranchée d'où les cadavres à peine décomposés sont arrachés pêle-mêle pour être enfouis en quelque coin perdu. Crions à l'innocence, à la profanation et exaltons la beauté, les vertus purificatrices du feu ! Sous la nappe de flammes qui le réchauffe, l'affine, le corps aimé, admiré est transformé, pour ainsi dire, instantanément en une légère fumée et quelques poignées de cendres blanches que les générations vénéreront à jamais ! Pussions-nous trouver les accents propres à émouvoir les âmes, et notre cause sera gagnée, à condition toutefois que les faits ne nous démentent pas trop crûment. Il n'y a pas seulement des libre-penseurs parmi les adeptes de la crémation, des libre-penseurs à qui importe peu que leur corps disparaisse en une heure ou en deux, qu'il soit rongé par les vers ou mordu par le feu, qui demandent la crémation parceque c'est un mode de sépulture éminemment rationnel, il y a parmi les partisans de la crémation d'ardents spiritualistes, des natures fines, pleines de sentiment que sollicite l'amour du pur et du beau. Pour ceux-là, pour tous ceux, ils sont légion qui ont la terreur de l'au delà, pour qui la tombe est le mystère, pour tous ceux-là, une propagande de plus de dix années auprès du public nous autorise à le déclarer, il faut pratiquer la crémation avec solennité, à la façon d'un culte. Les promoteurs de la crémation sont la révolution, l'avaient ainsi compris. Dans un rapport sur les sépultures présenté en l'an VII. (1798) à l'administration centrale du Département de la Seine le citoyen Camby proposait d'élever sur les hauteurs de Montmartre un fastueux monument : " Quatre grandes portes dédiées à l'enfance, à la jeunesse, à la virilité, à la vieillesse serviraient d'entrée à ce grand établissement, elles conduiraient, par quatre routes sinueuses au monument central, image du dernier terme de la vie. Ce monument offre une pyramide de vingt-huit mètres de base



“ un trépied la couronne. Cetta pyramide serait disposée dans l'intérieur de manière à ce que le travail nécessaire pour consumer les corps pût “ se faire *sans que le public s'en apercût.*” Le rapport règle ensuite avec cette pompe toute païenne si fort prisée au temps de la révolution la façon dont les corps devaient être amenés “ dans l'intérieur de ce majestueux monument.” Cet excès de solennité, assurément critiquable, serait préférable au sans-façon scientifique avec lequel on opère au Père-Lachaise. Les agents de l'administration, reconnaissons le font preuve de tact et de décence, les appareils fonctionnent d'une manière satisfaisante mais le cadre et les instruments ne sont nullement en harmonie avec la grandeur, le caractère de l'ultime opération qui s'y accomplit. Encore privé d'une façade, avec son entrée provisoire, ses cheminées mal dissimulées et maculées de suie, le monument crématoire, sorte d'usine Macabre détonne lugubrement au milieu des ombrages et des tombes artistiques du cimetière. À l'intérieur, les murailles à peine recouvertes de draperies, le chariot d'introduction avec ses grands bras et son mécanisme apparent, la carcasse de briques et de fer de l'appareil, disons plutôt du four, pour parler comme l'administration, le manque d'espace, le spectacle de l'enfournement du cercueil, du *défournement* des cendres, le manque absolu de cérémonial, en un mot tout ce qui se fait, se voit et se dit, est si crû, si pitoyable qu'à moins d'avoir l'esprit fortement trempé, on préférera l'inconnu, le mystère de la tombe; ou bien, pris de désespérance, redoutant également l'incinération et l'inhumation, on se cantonnera dans l'indifférence finale; ce sera le succès définitif de la routine, du parti-pris, de l'ignorance! Le monument inachevé du Père-Lachaise a beaucoup plus nui au développement de la crémation en France que l'opposition du clergé catholique. Sacrifiant aux goûts et aux habitudes des populations, les premiers Chrétiens se sont fait un culte à l'image des païens; ils ont adopté la pompe de leurs cérémonies religieuses, ils ont orné leurs pierres tombales, d'idoles qu'ils se défendaient d'adorer. À notre tour, nous sommes conduits à nous inspirer des pratiques du catholicisme pour renover et faire prospérer une coutume païenne; employons plus de festons, d'astragales, de fleurs, de draperies; des chants, de la musique, des discours, sans exagération bien entendu, ou c'en est fait de notre cause jusqu'au jour où l'encombrement des cimetières imposera de décréter l'obligation là ou nous voudrions voir toujours la liberté.

En conséquence nous demandons au Congrès d'émettre le vœu :

*Que l'opération de la crémation soit effectuée avec un cérémonial imposant dans des monuments ornés et aménagés avec la plus grande perfection.*



**Note sur la Crémation à Paris en 1891.**

PAR

M. CHARLES CAFFORT, Chef du Bureau des Cimetières de la Ville de Paris.

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L'historique de la question de la crémation a été fait tant de fois qu'il semble inutile de la refaire. Rappelons seulement en quelques mots que, en ce qui concerne l'Europe, après plusieurs siècles de disparition absolue, la crémation dut sa résurrection au moins en principe à la Révolution Française de 1789, et que la première incinération des temps modernes eut lieu à Paris le 1<sup>er</sup> floréal an IX. (autorisation donnée par Frochot, Préfet de la Seine, à la citoyenne Dupré Geneste, épouse du citoyen Lachêze, de brûler le corps de son enfant âgé de huit mois). C'est également la Ville de Paris, qui, avant même que la crémation fût autorisée légalement en France, obtenait, après de vives instances auprès du gouvernement, l'autorisation de construire dans un de ses cimetières un appareil destiné à incinérer les débris humains provenant des amphithéâtres de dissection, appareil qui a pu, dès la promulgation de la loi autorisant la crémation facultative, servir à des incinérations.

Enfin, actuellement encore, la ville de Paris est la seule ville Française qui possède un appareil crématoire.

Les renseignements qui font l'objet de la présente note, bien que spéciaux à Paris, s'appliquent donc à la France entière.

**LÉGISLATION.**

La loi du 15 septembre 1887 sur la liberté des funérailles a autorisé le choix de modes de sépulture autres que l'inhumation, tout en décidant qu'un règlement d'administration publique déterminerait les conditions afférentes aux divers modes de sépulture.

Ce règlement a été promulgué le 27 avril 1889, en voici la teneur en ce qui concerne la crémation :—

**TITRE III.****DE L'INCINÉRATION.**

Art. 16.—Aucun appareil crématoire ne peut être mis en usage sans une autorisation du Préfet accordée après avis du Conseil d'Hygiène.

Art. 17.—Toute incinération est faite sous la surveillance de l'autorité municipale. Elle doit être préalablement autorisée par l'officier de l'état civil du lieu du décès, qui ne peut donner cette autorisation que sur le vu des pièces suivantes :

- 1° Une demande écrite du membre de la famille, ou de toute autre personne ayant qualité pour pourvoir aux funérailles ; cette demande indiquera le lieu où doit s'effectuer l'incinération.

2° Un certificat du médecin traitant, affirmant que la mort est le résultat d'une cause naturelle.

3° Le rapport du médecin assermenté commis par l'officier de l'état civil pour vérifier les causes du décès.

A défaut d'un certificat d'un médecin traitant, le médecin assermenté doit procéder à une enquête sommaire dont il consignera les résultats dans son rapport.

Dans aucun cas, l'autorisation ne peut être accordée que si le médecin assermenté certifie que la mort est due à une cause naturelle.

Art. 18.—Si l'incinération doit être faite dans une autre commune que celle où le décès a eu lieu, il doit en outre être justifié de l'autorisation de transporter le corps, conformément à l'art 4.

Art. 19.—La réception du corps et son incinération sont constatées par un procès-verbal qui est transmis à l'autorité municipale.

Art. 20.—Les cendres ne peuvent être déposées, même à titre provisoire, que dans des lieux de sépulture régulièrement établis.

Art. 21.—Les cendres ne peuvent être déplacées qu'en vertu d'une permission de l'autorité municipale.

Art. 22.—Toute contravention aux dispositions réglant les conditions des sépultures et contenues dans les articles 3, 4, 8, 12, 16, 17, 18, 20 et 21, est passible des peines prévues aux articles 3 et 5, de la loi du 15 Novembre 1887.

## I. FORMALITÉS POUR LES INCINÉRATIONS.

### 1° *Décès survenus à Paris.*

En pratique, à Paris, il est procédé de la manière suivante.

Toutes les fois qu'une personne se présente à la mairie pour déclarer un décès, il lui est remis une notice imprimée indiquant les formalités à remplir pour les incinérations.

Si la famille choisit ce mode de sépulture, elle doit prévenir immédiatement la mairie, et lui remettre, 1° la demande écrite : 2° le certificat du médecin traitant visés par l'art. 17 du décret du 27 avril 1889, ci-dessus :—

La mairie prévient directement le médecin chargé de la contre-visite.

Il y a à Paris actuellement deux médecins préposés à ce service, pour lequel ils ont prêté serment devant la 1<sup>re</sup> Chambre du Tribunal de la Seine; un honoraire de 10 francs payé par la ville, leur est attribué par chaque vacation.

L'heure du convoi est fixée par la mairie qui s'entend téléphoniquement à cet égard avec l'administration centrale (bureau des cimetières à l'hôtel de ville).

Comme pour les décès suivis d'inhumation, la famille s'entend avec l'administration des pompes funèbres pour la classe du convoi et les fournitures réelles.

Il est recommandé, pour les corps destinés à être incinérés, de ne prendre qu'une bière en peuplier ou en sapin, dans laquelle ne doit être introduite aucune étoffe, papier ou substance quelconque.



*2°. Décès survenus en dehors de Paris.*

Si le décès est survenu non à Paris mais en province, toutes les pièces mentionnées par le décret doivent être produites à la mairie du lieu du décès, seule compétente pour autoriser l'incinération ; à Paris, il suffit de présenter au bureau des cimetières :—

1°. l'autorisation du maire ;

2°. l'autorisation de transport du corps délivrée par le Préfet de Police.

Les conditions pour la mise en bière et le transport des corps destinés à être incinérés ont été déterminées par la circulaire Ministérielle du 27 Mai 1890.

En voici le résumé :—

Le corps doit être placé dans un cercueil en bois léger, dont les dimensions au maximum seront : longueur 2 mètres, largeur 0·60, hauteur 0·50, et dont les parois intérieures seront badigeonnées au goudron, et garnies de toile caoutchoutée ou de carton bitumé :—

Le vide entre le corps et la garniture intérieure sera comblé par une substance absorbante, telle que poudre de tourbe, déchets de coton, sciure de bois, imbibée d'une solution phéniquée.

Si le transport du corps doit avoir lieu à une distance moindre de 200 kilomètres, ce premier cercueil sera enfermé dans une bière en chêne à parois de 25 millimètres d'épaisseur assemblées à vis et consolidées par deux frettes en fer vissées.

Si la distance à parcourir, est de 200 kilomètres ou au-dessus, le 1<sup>er</sup> cercueil sera renfermé dans une bière de plomb, recouverte d'une enveloppe de chêne. A l'arrivée au monument crématoire, ces enveloppes sont dévissées, et le cercueil en bois léger est seul introduit dans le four crématoire.

*3°. Urnes.—Columbarium.*

Après l'incinération, les cendres sont recueillies dans une urne dont la fourniture est à la charge des familles. Celles-ci sont libres d'adopter la forme et la matière qu'elles jugent convenables, si l'urne doit être placée dans une sépulture de famille. Si les cendres doivent être déposées dans le columbarium municipal, l'urne doit avoir les dimensions suivantes : hauteur 0·28, longueur 0·48, largeur 0·28.

Dans le premier cas, les familles peuvent déposer les urnes soit en concession temporaire, soit en concessions perpétuelles.

Pour ces dernières, elles sont autorisées, si elles le demandent, à n'acquérir qu'une concession d'un mètre superficiel.

D'après les instructions ministérielles, les urnes contenant des restes incinérés ne peuvent être placées à l'extérieur des monuments funéraires ; elles doivent toujours être inhumées, sans qu'il soit nécessaire de les placer à la profondeur des inhumations de corps, il suffit qu'elles soient recouvertes d'une dalle ou pierre dure.

Ces prescriptions, se justifient par la nécessité de protéger les cendres contre une profanation possible ou contre les atteintes du temps, qui renverse tôt ou tard les monuments les plus solides.

Quant au columbarium municipal (voir plus loin sa description sommaire), il ne renferme que des cases destinées à être occupées temporairement. Toute incinération, même gratuite, donne droit à l'occupation pendant cinq ans, d'une case du columbarium; après cinq ans, les familles sont admises à prolonger l'occupation de la case pour une nouvelle période quinquennale moyennant le versement d'une somme de 50 francs. (Cette somme est le prix d'une concession temporaire de 5 ans dans les cimetières parisiens.)

#### 4°. *Tarif des Incinérations.*

Aux termes de l'art. 25 de la loi de finances du 17 juillet 1889, les communes dans lesquelles sont installés des appareils crématoires peuvent percevoir des droits pour l'incinération des corps. Les tarifs sont délibérés pour les Conseils Municipaux et soumis à l'approbation du Préfet.

Le Conseil Municipal de Paris, en exécution de cette disposition légale arrêta le 7 Août 1889, une tarification des droits d'incinération qui fut approuvée par arrêté Préfectoral du 27 Septembre suivant.

Cette tarification, un peu élevée, a été modifiée par une nouvelle délibération du 27 Décembre 1889, approuvée par arrêté du 30 Décembre suivant.

Cette tarification est toujours en vigueur, elle est fondée sur le principe admis à Paris, en matière d'inhumation, que les riches doivent supporter les frais des convois pauvres, et que par conséquent la taxe à payer est proportionnelle à la classe du convoi.

Le tarif est le suivant :--

1 <sup>re</sup> classe	-	-	-	} 250 francs.
2 <sup>e</sup> „	-	-	-	
3 <sup>e</sup> „	-	-	-	200 „
4 <sup>e</sup> „	-	-	-	150 „
5 <sup>e</sup> „	-	-	-	100 „
6 <sup>e</sup> „	-	-	-	} 50 „
7 <sup>e</sup> „	-	-	-	
8 <sup>e</sup> „	-	-	-	
Service ordinaire	-	-	-	
Service gratuit	-	-	-	Néant.

Les Maires de Paris peuvent, comme pour les inhumations, accorder par arrêté spécial, la gratuité de l'incinération quand ils estiment que la famille est hors d'état d'en acquitter les frais, alors même que le décédé n'était pas inscrit au bureau de bienfaisance.

En ce qui concerne les corps amenés directement de l'extérieur au monument crématoire, et pour lesquels il n'y a pas de convoi régulier, la taxe d'incinération perçue est celle de la 5<sup>e</sup> classe. Mais ces corps sont exempts du paiement de la taxe spéciale frappant les corps amenés de l'extérieur aux cimetières de Paris.

De même, les corps exhumés d'un cimetière parisien pour être incinérés sont exempts du paiement de la taxe d'exhumation. (Délibération du 26 Juin 1889, arrêté du 27 juillet 1889.)

La taxe d'incinération est acquittée entre les mains du receveur du cimetière de l'Est à l'arrivée du corps au monument crématoire.

## II. FONCTIONNEMENT (MONUMENT CRÉMATOIRE—APPAREIL D'INCINÉRATION—COLUMBARIUM).

### 1°. *Monument crématoire.*

Le monument crématoire de la Ville de Paris a été édifié en 1886-1887 au cimetière de l'Est (Père La Chaise) conformément au projet dressé par M. Formigé, architecte des promenades et approuvé par délibération du Conseil Municipal du 29 Juillet 1885. Il est situé sur le sommet du plateau, et occupe avec ses dépendances, entourées de massifs et plantations, toute la 87<sup>e</sup> division. Une partie seulement du projet adopté est exécutée. Dans son état actuel, le monument crématoire n'a que le tiers environ de la surface qu'il doit avoir définitivement; c'est la partie destinée à recevoir les appareils d'incinération avec une galerie de dégagement en avant et une salle d'attente pour le public, qui est construite.

La disposition architecturale adoptée est la suivante: le rez de chaussée, ou plutôt l'étage en soubassement est réservé au dépôt du combustible et aux ouvriers chauffeurs; le rez de chaussée contient la salle du public et les deux salles où sont installés les appareils crématoires. Ces trois pièces, dont la centrale est d'une superficie double des salles latérales, arrondies en forme d'hémicycles sont recouvertes de dômes en maçonnerie s'élevant à une hauteur assez grande pour masquer les deux hautes cheminées d'angle. L'ensemble de ces trois dômes vu de l'extérieur est d'un aspect imposant et d'un bel effet architectural.

L'accès se fait par un escalier provisoire installé en face la salle centrale, qui sert actuellement pour le public, et qui, plus tard, lors de l'achèvement du monument est destinée à recevoir un 3<sup>e</sup> appareil crématoire.

Le monument complet comportera une façade avec rampes d'accès et des bas côtés correspondant aux salles d'incinération, et servant de salles d'attente pour les familles.

Le dépenses de construction, du monument crématoire actuel se sont élevées à la somme de 245,000 francs.

### 2°. *Appareils d'incinération.*

A.—*Appareil Gorini.*—Au moment de l'inauguration du monument crématoire le 15 Décembre 1887, l'appareil employé, conformément au vote du Conseil Municipal, était un four du système Gorini, du modèle adopté à Milan. Les résultats obtenus lors des expériences poursuivies à l'aide de cadavres non réclamés provenant des hôpitaux étaient identiques à ceux de Milan. Les corps introduits dans l'appareil étaient brûlés, dans un espace de temps variant entre 1 $\frac{3}{4}$  heure et 2 heures, et réduits en cendres extrêmement blanches, sans aucun mélange de matières carbonisées, sans odeur et sans fumée. Des résultats analogues ont été



obtenus pour les 13 incinérations qui ont été effectuées dans cet appareil en 1889, lorsque la promulgation du décret réglementant les incinérations a permis d'accueillir les demandes des familles.

Mais dès le principe de graves objections s'élevaient contre l'emploi de l'appareil Gorini ; en premier lieu la durée trop longue de l'opération. Si en effet un délai de 2 heures ne présentait pas de difficultés à Milan en raison du nombre restreint des incinérations, il n'en était pas de même à Paris, où par suite de l'énorme différence de population, et par suite aussi de la résolution prise par le Conseil Municipal d'incinérer les débris d'hôpitaux (3,500 à 4,000 corps par an) au lieu de les inhumer, il était nécessaire d'employer un appareil à marche plus rapide et à fonctionnement continu.

En second lieu, le coût de l'opération, par suite du prix élevé du bois à Paris, était une grave considération ; chaque incinération, coûtant rien qu'en combustible, y compris le chauffage préliminaire du four, de 20 à 25 francs. Aussi l'administration fut elle amenée à chercher un appareil ne présentant pas les mêmes inconvénients.

B.—*Appareil Toisoul et Fradet.*—À la suite de longues études poursuivies par l'administration de concert avec M. Chassaing, Conseiller Municipal, aujourd'hui Député de Paris, elle adopta un appareil au gaz avec récupérateur qui fut construit pour le compte de la ville, par MM. Toisoul et Fradet, et inauguré le 5 août 1889.

Cet appareil comporte : 1°. Un gazogène établi dans le sous-sol et produisant, par la combustion incomplète du coke, du gaz oxyde de carbone qui, allumé à l'entrée du four par des brûleurs spéciaux, produit une température très élevée pour une dépense très minime.

2°. Un récupérateur de chaleur projetant dans le four l'air chauffé par les gaz provenant de l'appareil.

3°. Un four à reverbère, la sole est pourvue de deux entailles permettant le passage des bras du chariot dont il sera question plus loin.

4°. Une cheminée d'appel.

Les résultats de cet appareil sont incontestablement bien supérieurs à ceux de l'appareil Gorini, puisque les incinérations s'y effectuent en une heure ou une heure  $\frac{1}{4}$  et que la dépense de combustible ne s'élève pas à plus de 3 francs par opération. Il y a lieu toutefois d'appeler l'attention sur la remarque suivante : La Ville de Paris au point de vue des incinérations n'est pas dans des conditions ordinaires. Ayant à détruire par le feu les restes des 3,500 à 4,000 cadavres par an provenant des amphithéâtres de dissection, elle peut employer un appareil continu, un gazogène brûlant jour et nuit, ce qui réduit sensiblement la dépense des incinérations demandées par les familles ; en effet l'appareil servant exclusivement à la crémation des débris d'hôpitaux, il suffit de suspendre ce service pendant l'incinération du corps amené par les familles, pour le reprendre ensuite quand cette opération est terminée.

Il n'en est pas de même des autres villes où se pratique la crémation, et qui n'ayant qu'à pourvoir à un petit nombre d'incinérations, espacées à des époques plus ou moins éloignées, n'ont aucun intérêt à posséder un

appareil crématoire allumé sans interruption, et doivent en conséquence avoir recours à des appareils intermittents.

C.—*Appareil Fichet*.—En raison même de la nécessité de faire fonctionner continuellement l'appareil crématoire municipal il était nécessaire de pouvoir, en cas d'interruption du service pour cause de réparation, disposer d'un autre appareil de rechange. L'Administration Municipale au lieu de se borner à une copie de l'appareil existant, songea à profiter de l'expérience acquise pour construire un appareil plus perfectionné. M. Fichet, ingénieur civil, qui en collaboration avec M. Muller avait présenté à l'Exposition Universelle de 1878 un projet de four crématoire, s'offrit à édifier un appareil permettant de procéder à une incinération en 15 minutes de moins que l'appareil Toisoul et Fradet.

Cette offre ayant été acceptée, M. Fichet fit, sur l'emplacement primitivement occupé par l'appareil Gorini, reconnu absolument inutilisable, construire un appareil qui a été inauguré le 19 janvier 1891.

Cet appareil se compose comme le précédent d'un gazogène fournissant de l'oxyde de carbone, et d'un récupérateur fournissant de l'air chaud à la chambre voûtée dans laquelle s'effectue l'incinération. La différence, c'est que l'oxyde de carbone ne sert qu'à chauffer le récupérateur, et que la combustion du cadavre s'opère par l'air chaud seul, grâce au volume considérable du récupérateur, bien que selon les besoins, on puisse envoyer dans le four du gaz aussi bien que de l'air. Les résultats obtenus sont bien ceux que se promettait M. Fichet : les corps introduits dans son appareil sont complètement incinérés en 50 ou 55 minutes. La dépense de combustible est un peu plus élevée que celle de l'appareil Toisoul et Fradet (18 hectolitres de coke par jour au lieu de 14).

D.—*Appareil O. André et Piat pour l'Introduction des Corps*.—L'introduction et la sortie des corps dans les deux appareils crématoires ci-dessus mentionnés s'effectue au moyen d'un appareil spécial construit pour la Ville de Paris par MM. O. André et Piat. Il avait été reconnu, quand on employait l'appareil Gorini, qu'une des grosses difficultés du fonctionnement de la crémation consistait dans le retrait de la sole contenant les résidus de l'incinération, en raison des déformations que faisait subir l'énorme température du four tant à la sole elle-même qu'aux galets et glissières métalliques sur lesquels elle devait rouler. C'est pour parer à ces difficultés qu'a été établi l'appareil O. André et Piat. Cet appareil se compose d'un chariot monté sur des rails encastrés dans le pancher. À ce chariot massif et muni à l'arrière de contre poids très lourds, sont adaptés en avant deux longerons articulés formant fourchette, sur lesquels on peut placer, soit la sole métallique supportant le cercueil, soit directement le cercueil lui-même. Ces deux longerons sont creux et intérieurement remplis d'eau, ce qui empêche toute déformation de la partie de l'appareil à introduire dans le four. À l'intérieur du four sont ménagées sur la sole deux rainures correspondant par leur position et leur profondeur aux longerons de l'appareil introducteur. Pour une incinération, le cercueil étant porté

au fond du four au moyen des longerons qui ont pénétré dans ces rainures, un simple mouvement de déclié abaisse les longerons qui sont ramenés en arrière en laissant le cercueil à l'intérieur du four. À la fin de l'opération, les longerons introduits de la même manière sont relevés et rapportent la sole métallique avec les cendres. Quant à celles provenant de l'incinération des débris d'hôpitaux la sole métallique n'étant pas employée et les cercueils étant placés directement sur les longerons, on adapte à l'extrémité de ceux-ci une raclette métallique, munie à son extrémité inférieure d'un balai de tiges d'acier ; cette raclette étant abaissée quand l'appareil est arrivé au fond du four, amène avec elle toutes les cendres qui sont recueillies à la sortie.

E.—*Fonctionnement de l'appareil crématoire.*—Les détails qui précèdent donnent une idée suffisamment nette du fonctionnement de l'ensemble de l'appareil. Ajoutons quelques mots sur le cérémonial des incinérations.

La salle centrale du monument crématoire, qui sert de salle d'attente pour les familles, se prête par ses dispositions architecturales à des décorations funéraires imposantes. Les tentures varient suivant la classe du convoi adoptée par les familles, mais même pour les incinérations gratuite, la porte donnant accès à la salle d'incinération est drapée d'une tenture noire avec bandeau. À l'arrivée au monument crématoire, le cercueil retiré du char est introduit dans la salle d'attente et de là dans la salle d'incinération où les plus proches parents du décédé, au nombre de trois au plus, sont seuls admis, les autres assistants restent dans la salle d'attente où peuvent être prononcés des discours ou recitées des prières.

Le cercueil est placé sur la sole métallique posée sur les longerons de l'appareil d'introduction ; cette sole est recouverte d'un drap en toile d'amiante. Il est ensuite procédé à l'incinération, dont les progrès sont constatés, au moyen des regards placés sur les côtés de l'appareil Toisoul et Fradet à l'arrière de l'appareil Fichet. Quand la combustion est complète, la sole est retirée, les cendres sont recueillies à l'aide de pinces en métal et déposées dans l'urne qui est ensuite fermée à la chaux et scellée d'un cachet aux armes de la Ville de Paris. Puis cette urne est immédiatement, soit inhumée dans une sépulture du cimetière de l'Est, soit remise à la famille pour être transportée dans un autre cimetière, soit déposée dans une case du columbarium municipal.

F.—*Columbarium.*—Ce columbarium qui vient d'être achevé tout dernièrement (juin 1891) est établi le long du mur d'enceinte du cimetière de l'Est dans le voisinage du crématoire. Cet emplacement a l'avantage de se prêter, d'une manière pour ainsi dire indéfinie, à l'établissement de portiques successifs formant les travées du columbarium. Une seule travée est actuellement construite sur une longueur de 13 mètres 60 c. ; elle contient 354 cases. Celles-ci protégées par un auvent contre la pluie et le soleil, sont à l'abri de toute détérioration, provenant des variations atmosphériques. Chacune des cases, en maçonnerie, a les dimensions suivantes ; hauteur 0<sup>m</sup>.29., largeur 0<sup>m</sup>.29., profondeur 0<sup>m</sup>.47. Sur le devant est ménagée une double rainure ; dans la



première s'encastre une dalle qui ferme la case quand l'urne y a été déposée. Cette dalle est ensuite scellée. La 2<sup>e</sup> rainure est destinée à recevoir la plaque que la famille voudra y apposer (en métal, en pierre, ou en verre à son choix) et sur laquelle elle pourra placer telle inscription qu'elle jugera convenable, sous réserve, bien entendu, de l'approbation de l'autorité municipale aux termes de l'ordonnance du 8<sup>e</sup> Octobre 1843. La dépense du columbarium revient à 59 francs par case soit 30 francs pour chaque case (maçonnerie, taille, sciage, feuillure, etc.) et 29 francs pour la partie architecturale et décorative du monument.

### III. STATISTIQUE.

Il nous reste à exposer sommairement la statistique des incinérations effectuées dans les appareils municipaux depuis leur inauguration jusqu'au 31 juillet dernier.

Rappelons que ces appareils procèdent à l'incinération :—

1°. Des corps dont la crémation est demandée par les familles et autorisée par les maires.

2°. Des débris humains provenant des amphithéâtres de dissection.

3°. Des embryons, ou produits de la conception, venus au monde avant quatre mois de gestation.

#### ÉTAT NUMÉRIQUE DES INCINÉRATIONS EFFECTUÉES.

Années.	Incinérations demandées par les familles.	Débris d'hôpitaux.	Embryons.	Total.
1889 - -	49	483 <sup>(1)</sup>	217 <sup>(1)</sup>	749
1890 - -	121	2,188	1,079	3,388
1891 jusqu'au 31 juillet	81	1,669	713	2,463
Totaux - -	251	4,340	2,009	6,600

(1) L'Incinération des débris d'hôpitaux et des embryons ne fonctionne que depuis le 5 août 1889.

#### DÉTAILS RELATIFS AUX INCINÉRATIONS DEMANDÉES PAR LES FAMILLES.—ANNÉE 1889.—1°. APPAREIL GORINI.

Âgé.	Sexe.		Total.	Durée de l'Incinération.			
	Masculin.	Féminin.		Moins de 60 minutes.	De 1 h. à 1 h. 30.	Plus de 1 h. 30.	Mo-yenne.
0 à 9 ans - -	1	—	1	1	—	—	H. M. 0 50
10 à 29 ans - -	1	—	1	—	1	—	1 25
30 à 59 ans - -	5	2	7	—	1	6	1 50
60 ans et au dessus -	3	1	4	—	—	4	1 55
Totaux -	10	3	13	1	2	10	—

## 2°. APPAREIL TOISOUL ET FRADET.

Age.	Sexe.		Total.	Durée de l'Incinération.			
	Masculin.	Féminin.		Moins de 60 minutes.	De 1 h. à 1 h. 30.	Plus de 1 h. 30.	Mo-yenne.
0 à 9 ans - -	3	2	5	5	—	—	H. M. 0 40
10 à 29 ans - -	3	2	5	2	2	1	1 0
30 à 59 ans - -	8	5	13	3	9	1	1 10
60 ans et au dessus -	9	4	13	—	11	2	1 15
Totaux -	23	13	36	10	22	4	—

## ANNÉE 1890.—(APPAREIL TOISOUL ET FRADET).

Age.	Sexe.		Total.	Durée de l'Incinération.			
	Masculin.	Féminin.		Moins de 60 minutes.	De 1 h. à 1 h. 30.	Plus de 1 h. 30.	Mo-yenne.
0 à 9 ans - -	12	6	18	17	1	—	H. M. 0 40
10 à 29 ans - -	5	2	7	3	4	—	1 0
30 à 59 ans - -	28	14	42	72	30	—	1 2
60 ans et au dessus -	34	20	54	10	41	3	1 5
Totaux -	79	42	121	42	76	3	—

## ANNÉE 1891.—JUSQU'AU 31 JUILLET (APPAREIL FICHET).

Age.	Sexe.		Total.	Durée de l'Incinération.			
	Masculin.	Féminin.		Moins de 60 minutes.	De 1 h. à 1 h. 30.	Plus de 1 h. 30.	Mo-yenne.
0 à 9 ans - -	4	3	7	7	—	—	H. M. 0 32
10 à 29 ans - -	—	4	4	2	2	—	0 50
30 à 59 ans - -	27	10	37	25	12	—	0 52
60 ans et au dessus -	23	10	33	23	9	1	0 55
Totaux -	54	27	81	57	23	1	—

ANNÉE 1890.—CLASSES DES CONVOIS DES DÉCÉDÉS.

Domicile des décédés.											Totaux.		
											Gratuites.	Parfaites.	Totaux.
1 <sup>re</sup> Classe.	2 <sup>e</sup> Classe.	3 <sup>e</sup> Classe.	4 <sup>e</sup> Classe.	5 <sup>e</sup> Classe.	6 <sup>e</sup> Classe.	7 <sup>e</sup> Classe.	8 <sup>e</sup> Classe.	9 <sup>e</sup> Classe.					
10 1 <sup>ers</sup> Arrond <sup>ts</sup> de Paris	-	—	—	1	1	11	9	8	4	8	3	39	42
10 derniers, do.	-	—	—	1	—	1	3	20	7	23	16	39	55
Arrond <sup>t</sup> de St Denis	-	—	—	—	—	3	—	—	—	—	—	3	3
Do. de Seeaux	-	—	—	—	—	5	—	—	—	—	—	5	5
Hors du Dép <sup>t</sup> . de la Seine	-	—	—	—	—	16	—	—	—	—	—	16	16
Totaux	-	—	—	2	1	36	12	28	11	31	19	102	121

ANNÉE 1891 JUSQU'AU 31 JUILLET.

Domicile des décédés.	1 <sup>re</sup> Classe.	2 <sup>e</sup> Classe.	3 <sup>e</sup> Classe.	4 <sup>e</sup> Classe.	5 <sup>e</sup> Classe.	6 <sup>e</sup> Classe.	7 <sup>e</sup> Classe.	8 <sup>e</sup> Classe.	9 <sup>e</sup> Classe.	Totaux.			
										Gratuites.	Parfaites.	Totaux.	
10 1 <sup>ers</sup> Arr <sup>ts</sup> de Paris	-	—	1	1	2	2	7	4	2	9	4	28	32
10 derniers Arr <sup>ts</sup>	-	—	—	—	2	6	6	12	3	12	9	32	41
Arrond <sup>t</sup> de St Denis	-	—	—	—	—	2	—	—	—	—	—	2	2
Do. Seeaux	-	—	—	—	—	2	—	—	—	—	—	2	2
Hors du Dép <sup>t</sup> de la Seine	-	—	—	—	—	4	—	—	—	—	—	4	4
Totaux	-	—	1	1	4	20	13	16	5	21	13	68	81

Assainissement des Cimetières.

PAR

MM. BROUARDEL, DU MESNIL ET OGIER.

L'agglomération de la population dans les grandes villes est pour les hygiénistes une source de préoccupations sérieuses.

Il faut pourvoir à la surveillance sanitaire des eaux potables livrées à la consommation, de l'alimentation, du logement, et à l'éloignement des matières usées, à la disparition des corps de ceux qui meurent.

Cette dernière question est particulièrement délicate et la ville de Paris, depuis quelques années, s'en est préoccupée. À cet effet, elle a étudié les moyens d'assainir les cimetières. Les études ont porté à la fois sur l'air, le sol et les eaux dans ces champs de repos.

Dans une première série de recherches, dues à MM. Schützemberger, Carnot, Miquel et du Mesnil, elle a établi :



- 1° Que si dans le voisinage des anciens charniers, et surtout alors que les inhumations se faisaient dans les églises, on a pu observer des accidents résultant du dégagement des gaz produits par la putréfaction, ces dangers sont devenus absolument illusoires aujourd'hui où ils se répandent à l'air libre; que l'atmosphère des cimetières actuels est pure de tout produit gazeux délétère, de tous les éléments figurés nocifs;
- 2° Que dans les cimetières actuels le sol ne renferme que de l'acide carbonique en grande quantité, à l'exclusion de tout autre gaz en quantités appréciables;
- 3° Que la décomposition des cadavres confiés à la terre serait vraisemblablement activée par le drainage du sol.

La seconde série d'expériences a été faite par MM. Brouardel, du Mesnil et Ogier. Elles avaient pour objet d'examiner quelle était l'action exercée sur la décomposition des corps inhumés par des préparations diverses déposées dans les cercueils au moment de la mise en bière, tant pour éviter l'issue des liquides provenant du cadavre que pour masquer les odeurs qui s'en dégagent.

Ils ont étudié ensuite qu'elle était l'influence de l'aération, de l'humidité du sol des cimetières sur la marche de la putréfaction, et ils concluent :

- 1° Que plus le cadavre inhumé est en contact avec l'air par le fait de la perméabilité du sol, de la porosité de la bière, plus sa destruction est rapide et complète; la présence de l'air favorisant l'éclosion de ces êtres inférieurs, de ces *travailleurs de la mort* qui sont les agents les plus actifs de la destruction des cadavres;
- 2° Que toute substance mise dans la bière pour en assurer l'étanchéité, sciure de bois mélangée ou non de substances antiseptiques ou simplement aromatiques, poussière de charbon, feuilles de caoutchouc, de carton bitumé doublant la bière, retardent dans une proportion considérable la destruction des cadavres.

Toutes ces matières s'opposent au développement des animalcules la plupart aérobies qui paraissent être agents les plus actifs de la destruction des cadavres;

- 3° Que l'inhumation dans un sol humide ou imperméable retarde considérablement la putréfaction.

En conclusion, M. Ogier (au nom de MM. Brouardel, du Mesnil et Ogier) présente ensuite quelques observations sur les circonstances qui empêchent spécialement la destruction des cadavres. Il cite comme exemple le cimetière de St. Nazaire établi dans la terre glaise, presque complètement imperméable à l'air, où les cadavres ne soubissent qu'une décomposition excessivement lente. L'établissement d'un système de drainage, amenant l'air au contact du cadavre, tel que le système appliqué par M. Coupry à St. Nazaire, produit de bons résultats et accélère, dans des proportions énormes, la destruction du cadavre. C'est ce que montrent les photographies des exhumations récemment faites dans ce cimetière.



## DISCUSSION.

**Sir Spencer Wells**, in answer to Mr. Seymour Haden's objection that cremation was "unnatural," contended that it was not more so than burial in the earth or in the sea. Everything depended upon what was meant by the term "natural." He told an anecdote of Sir James Simpson, who suggested to a lady the use of chloroform during her approaching confinement, but was met by the same objection—that "it was so unnatural." Finding that she had come from Belfast, and by steamer, Sir James at once retorted that this also was a most "unnatural" deviation from the "natural" method of crossing, namely, by swimming.

**Rev. F. Lawrence** (Vicar of Westow, York) spoke as Honorary Secretary of the Church of England Burial Reform Association. The mode of disposal of the dead which the Association advocated was that of "earth to earth," indicated in the Burial Service, and advocated by Mr. Seymour Haden. The Burial Service orders the priest and clerk to meet the corpse (no mention is made of a coffin), and to go before it either into the church or towards the grave. The church is not to be entered at all if there be any reason (such as possibility of danger to the living) to the contrary. Arrived at the grave-side, the body (again no mention of a coffin) is to be made ready to be laid into the earth—not into a bricked grave, or catacomb—the words of committal being: "We commit this body to the ground, earth to earth, ashes to ashes, dust to dust." During the service are to be said the words, "Thou sowest not the body that shall be," thereby indicating that the resurrection body will not depend for its identity upon the material particles of which the body consists at the time of burial. Last scene of all, the earth is to be cast upon the body. Such was the ancient mode of burial. Bodies were buried in the plain earth in linen or woollen. Churchyards so used were grave-crematoria, wherein the dead were reduced to their ultimate elements by the action of the earth and air, aided by the micro-organisms which abound in the living earth. This went on for a thousand years, but in the 17th century a gross system sprang up. In utter disregard of the rubric, the body was buried in a durable coffin, to the exclusion of the purifying influence of earth and air, with the result that town churchyards became noisome centres of pestilence, and were closed by Act of Parliament. The suburban cemeteries, strange to say, were conducted upon the same pernicious principles. Boxing up of animal putridity has been carried on to such an extent that at this moment there are 1½ million dead bodies around London—not buried, but simply boxed up to seethe in their own corruption, generating poisonous gases which no 'hermetical' sealing can effectually restrain. Mr. Seymour Haden startled the world with his memorable letters, and the Necropolis Company, in accordance with his suggestions, established the Brookwood Cemetery, a tract of land beautiful in situation, and of suitable soil, calculated to serve for the burial of the dead of London for all time to come. Sir Henry Thompson, despairing of effectual reform by any other means, advocated drastic measures, and the community had to thank him for emphasizing the truth that the disposal of the dead is in the main a sanitary question. Sir Spencer Wells had shown that (as was taught by Bishop Butler) our gross organised body formed no part of our real selves, that the dead body was not the person who had died, and that no mode of disposal of the dead could affect in the slightest degree the doctrine of the resurrection. The Church had founded an organisation for

bringing the nation back to the simple earth-to-earth burial, and to this end sermons had been preached, and meetings held at home and abroad. The Archbishop of Canterbury had urged the use of perishable coffins. Returns had been obtained from Parliament respecting metropolitan and provincial cemeteries, and the Government had been asked to concentrate in one department the control over burial-places now divided between the Home Office and the Local Government Board. Memorials were being prepared for presentation to the Prime Minister, the Royal College of Physicians, the Royal College of Surgeons, and the British Association. On behalf of the Burial Reform Association, he asked for the earnest co-operation of sanitarians with a view to banishing indifference, irreverence, and ignorance, and to introducing a mode of burial which shall be harmful to none.

**Dr. Ebenezer Duncan** (Glasgow) said that the Scottish Burial Reform and Cremation Society combined the objects advocated by the Church of England Burial Reform Association and by the Cremation Society. The reason for the existence of the society which he represented was the extensive prevalence of the insanitary and objectionable method of pit-burial in Glasgow and other Scotch towns. As an example of the danger of this, he mentioned the case of the Glasgow Royal Infirmary, where a surgical pavilion had inadvertently been built on the edge of an old cholera pit. The outbreak of hospital gangrene and pyæmia in the wards of that pavilion led to the examination of the cholera pit. The bodies were found to be partly converted into adipocere, partly in a state of advanced putrefaction. Many had been buried without coffins, and yet after 30 years they remained only partially decomposed. In Glasgow there were 19,000 interments annually, and about 9,000 of these were in pits and common graves. It was impossible for the poor to pay for separate graves, and it was undesirable, from the economic point of view, to set aside such a large amount of ground in proximity to crowded cities as would be necessary for that purpose. It was proven that crowded graveyards polluted the subsoil water and the soil which was needed for building purposes, and they drained into neighbouring sewers and watercourses. On all these grounds Dr. Duncan and the Scottish Society held that cremation was to be preferred to burial as the method of disposal of the dead of our large towns. As a teacher of medical jurisprudence, he held that the precautions adopted by the Cremation Society of England were quite sufficient to prevent any criminal abuse of the process.

**Dr. H. Franklin Parsons**, while appreciating the advantages of cremation, especially as regards economy of ground, thought that the dangers of interment, if properly conducted, had been overstated by the advocates of cremation. He believed that danger to health arose rather from corpses being kept unburied, and that a body surrounded and covered by a mass of suitable earth was not a source of danger to the public health.

**Dr. A. Brett** (Watford) mentioned an instance in which the body of a person dead of small-pox was carried to the grave by four bearers, of whom three only had been vaccinated; the fourth caught small-pox and died. Dr. Brett expressed strong approval of the process of cremation, which he had seen carried out at Woking.

**Mr. W. P. Buchan** (Glasgow), as a practical sanitarian, advocated cremation as being the only sure means of disinfecting the dead body.



He considered the objections of Mr. Haden to be purely imaginary, since greater precautions as to verifying the cause of death were adopted before cremation than before burial. Cremation was also a safeguard against desecration of the body at later periods. He cited a case in which, by the opening of a grave, portions of a dead body were thrown out with the soil, and a dog ran off with a bone to which human flesh was still adhering. The question was not a religious but a sanitary one, and those who wished to be cremated had as much right to demand it as those who desired ordinary burial.

**Surgeon-Major John Ince** challenged the self-styled sanitarians to show that cemeteries were dangerous, remarking that parsons, gravediggers, and others whose duties connected them with such places were at least as healthy as other men. He regretted that the shortness of time allowed for discussion prevented his proving that the whole system of so-called sanitation was a tissue of rubbish and fallacy.

**Dr. S. W. Abbott** (Secretary of the State Board of Health of Massachusetts) mentioned that, in the year 1885, cremation was legally sanctioned in Massachusetts. The same law referred the plans and conditions of cremation to the State board of health. The question of crime was settled by referring each case of proposed cremation to the medical examiner of the district, who was authorised to give a certificate of death in every case of proposed cremation, and to conduct an autopsy if he considered it necessary. The coroner's inquest was abolished by law in 1877. The medical examiner had superseded the coroner.

**Dr. E. F. Willoughby** (London) contended that cremation revealed rather than concealed crime. Under the Italian law, in cases of cremation, a *special* medical certificate, having the sanctity of an oath, was required in addition to the ordinary medical certificate. The former (confirmed by autopsy and analysis where requisite) must state that there is no possible doubt as to the cause of death being natural. By this means a case of accidental poisoning by sweets coloured with copper was detected at Turin. The sweets were traced and seized, after having given rise to non-fatal "enteritis" in others.

**Sir Henry Thompson**, in replying, said that he needed to refer to one point only. Mr. Haden had said that cremation was a direct incentive to crime. This was not so. On the contrary, cremation was a preventive, if, as at Woking, it was carried out only after a thorough inquiry into the causes of death. As to the medico-legal argument, inquiries from over 300 coroners had shown that in the course of 20 years in England and Wales only 100 exhumations had taken place for medico-legal purposes, and out of that number only 20 (or one per annum) had been exhumed for suspected poisoning. For this small matter it was suggested that 70,000 bodies dying of infectious disease every year should be allowed to contaminate the ground. He pointed out that the soil was very scarce in which burial could properly take place. With due precaution and inquiry into the cause of death, cremation was the only solution of the difficulty as to the disposal of the dead.

**Mr. Seymour Haden**, in replying, referred to Sir Henry Thompson's statement that during the last 20 years exhumations for suspected poisoning averaged only one per annum, and pointed out that the number of such suspected cases would increase if cremation were generally adopted, since the incentive to destroy by poison would be greater in

proportion as the chances of detection were diminished. Referring to the statement that it was desirable to disinfect dead bodies by chemical agency, he declared that the earth was the best and most available disinfectant, and instanced as a proof of its sufficiency the successful use made of it to stamp out cattle disease. Answering the objection that the poisoning of the watercourses in the neighbourhood of graveyards was inevitable, he cited the case of the Aldgate pump, situated close to a graveyard, as showing that a few feet of earth were sufficient, by changing its chemical composition, to deprive the foulest water of putrid matter contained in it.

(Mr. Ernest Hart here said that the Aldgate pump had been closed at his instigation, because of the deleterious properties of the water.) Mr. Haden insisted, however, that that very case afforded a remarkable example of the power he was claiming for the earth of depriving water of animal matter contained in it.\* Mr. Haden concluded by referring to the little value, in cases of poisoning, of the medical certificates relied upon by the cremationist, even when based on *post mortem* examination, since such examination to be effectual often involved the chemical analysis of remote organs and tissues, and therefore required not hours but weeks for its performance.

At the close of the discussion, Sir Henry Thompson moved, and Mr. Ernest Hart seconded, the following *Resolution* :—

“That the cremation of the dead is a rational and hygienic procedure, which is especially called for where death occurs from contagious disease.”

This was carried by an overwhelming majority, with only four dissentients.

The following *Resolutions*, proposed by Mons. George Salomons, and seconded by Mr. Lithiby, were then put to the meeting, and carried by similarly large majorities :—

“Le Septième Congrès Internationale d’Hygiène confirmant les vœux des Congrès Internationaux d’Hygiène qui l’ont précédé demande :

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\* Mr. Seymour Haden has supplied the following quotation from the appendix to a report by Sir John (then Mr.) Simon, medical officer of the Privy Council, relating to the water of the Aldgate pump.

“The water from this well is perfectly bright, clear, and even brilliant; it has an agreeable soft taste, and is much esteemed by the inhabitants of the parish, though, as will be seen by the subjoined analysis, it is an exceedingly hard water, and the large quantity of earthy salts it contains renders it unfit for all culinary and most domestic purposes . . . . (yielding carbonates of lime and magnesia, sulphate of lime, chloride of sodium, nitrates of potash, soda, magnesia, and ammonia, silica, and phosphate of lime; but of organic matter, none or scarcely a trace). . . . The quantity of nitrates in this water is very remarkable. These salts are doubtless derived from the decomposition of animal matter in the adjacent churchyard. Their presence, conjoined with the inconsiderable quantity of organic matter which the water contains, illustrates in a very forcible manner the power that the earth possesses of depriving the water that percolates it of any animal matter it may hold in solution; and, moreover, shows in how complete and rapid a manner the process is effected. In this case the distance of the well from the churchyard is little more than the breadth of the footpath, and yet this short extent of intervening ground has, by virtue of the oxydizing power of the earth, been sufficient wholly to decompose and render inoffensive the liquid animal matter that has oozed from the putrefying corpses in the churchyard.” (Second annual report on City of London (1850), Appendix p. 170.)

“1<sup>e</sup>. Que les gouvernements fassent disparaître les obstacles législatifs qui s’opposent encore à la crémation des cadavres.

“2<sup>e</sup>. Qu’ils aient à organiser la crémation des cadavres sur les champs de bataille.”



## The Statutory Education and Registration of Architects.

BY

W. HOWARD SETH-SMITH, President of the Society of Architects,  
and Fellow of the Surveyors' Institution.



I should not have trespassed upon your time by accepting the invitation of the Council of this Congress to read a paper upon the subject of the Statutory Examination and Registration of Architects had it not been for a very strong conviction that both the health and wealth of the community are largely dependent on the success of the endeavour to obtain such a measure. The differences of opinion in our profession are not on the question as to whether a more systematic and thorough training is required; all, I believe, admit that education is the basis of progress; the dispute is as to whether any test of the training should be applied, and if so, whether that test should be optional or compulsory. In the ranks of architecture there has happily arisen a strong reaction against the easy-going commonplace and imitative spirit—a dead set against the assumption that a man who is well qualified in planning, construction, and sanitary science is an architect apart from his possession, or non-possession of designing power, a cultivated taste, and skill in representing his ideas on paper. We affirm, and we challenge contradiction on this point, that, failing the art qualification, a person has no right to the title of architect. The recent correspondence in “The Times” will however have revealed the fact that a certain section of the profession (I believe a very small section, but one which includes a few eminent architects) holds that architecture has for some time been less constantly associated with the sister arts of painting and sculpture than is desirable; that examinations and diplomas, by raising artificial barriers, would have a tendency still further to alienate these branches of art; and moreover that artistic qualifications cannot be brought to the test of examination. None will be found to dispute one of the statements of fact upon which these gentlemen base their opinions, namely, that architecture has hitherto been too little associated with pure art; but not only have the leading professional bodies repudiated their deductions, but the success attending even the present examinations of the institute (which by the way are voluntary excepting as regards applicants for membership of that body, and are conducted by honorary examiners) has proved that some test of knowledge is a keenly felt need, whilst the improve-



ment from year to year in the quality of the candidates for examination and the progress of designing power since the institution of these examinations, is, we are assured, so far encouraging.

Those who oppose the establishment of examinations have, in their efforts to emphasize an important truth, lost sight of the first and foremost principle which regulates architectural employment, the principle, namely, that our opportunities of practice are dependent upon the confidence of the public in our qualifications.

Our eminent friends' enthusiasm for the art side of our calling is as fascinating and contagious, and this fascination is so irresistibly felt by many young students and budding architects who have not the ballast of an average professional experience, that it constitutes a very real danger to the future of architecture: for let us remember:—1. That a man is not necessarily any the worse designer because he is an accomplished constructor. 2. That we cannot regulate the training of the profession generally on the lines of the experience of a dozen exceptionally able men who have attained distinction (in spite perhaps of an imperfect training in constructive and sanitary science) by the sheer force of their originality and skill as designers; it is absurd to say that such men would have been excluded by the proposed tests; we must deal, as in all other professions, with the average man, and establish a curriculum which will raise the standard of the craft generally.

Who are the men who obtain the largest practice? Obviously those who combine with considerable artistic ability exceptional technical knowledge and capacity for the multifarious business of which every architect's practice is, and must ever be, largely composed. But very many men whose works declare them to be absolutely devoid of taste or power to design, manage to obtain and uphold a good practice. Why? For the simple reason that every client can recognise business and constructional ability, but comparatively few can discriminate between good and bad design; hence the great importance of an art test as a qualification to practice, if our British architecture is to make progress.

In an applied art, which is as costly as it is unalterable, the matters of primary importance to the public must ever be good planning, economical and sound construction, durability of material, excellence of the drainage, water-supply, ventilation and heating arrangements. Do not the foundations of the practice of most architects rest mainly in the confidence of our clients in our knowledge of these things? And this remark applies even more forcibly to the majority of our provincial friends, and more still to those who fill the posts of architects and surveyors to the urban and rural authorities, county councils, &c., involving as they do, such great responsibility for the health of the public. Once satisfy the public that we are competent to supervise all branches of the building trade, and in other matters of business in connexion with contracts, and building regulations, to safeguard their interest, and you have at once created a basis of employment in which your art acquirements will find their proper opportunities.

Why do the public so often apply to builders direct for much important work instead of through architects? unquestionably, because

they do not believe the scientific attainments of the latter are, as regards construction, superior, if equal to those of the builder, and they are keen enough to know that rule of thumb is not economical where science, even with art added, would be so.

What then would be the natural result of the anti-examination movement, but that employers would go to the builder in the first place, and that the builder would employ, if need be, the architect to decorate his plan and construction. I wonder if the memorialists realise this, and, if so, how they relish the prospect in the interests of architecture? They made an admirable suggestion in one of their letters to the "Times," viz., that builders should be registered as a protection to the public. But let us be consistent; can we allow that builders and plumbers should be examined and registered as skilled constructors, while we, who profess to be competent to supervise their work, and moreover, take commission on the operation, possess no credentials of any kind?

Having thus shown the fallacy of the opposition to the tests in the science department of our craft, I now ask your indulgence for a moment longer to consider the art question in relation to examinations. And at the outset I submit most emphatically that if both taste and its expression can be tested sufficiently to qualify for the Royal Academy, and other art schools, they can surely be tested well enough for architectural practice, and to prevent in the near future the costly disappointments in design which have had almost as much to do with the existing discredit and suspicion in which the profession is frequently held, as has the want of scientific training. An architect may have noble ideas, and a sense of beauty which may lead to his employment, but if he lack sufficient skill to convey his ideas to the mason and the carver, the most costly features in his work will be a disgraceful and standing failure;—in other words, the architect must be a draughtsman of no mean skill. Is it impossible or inexpedient to require an examination test of his skill?

I hope I have been able, so far, to show that examinations, both in the science and in the art of architecture, are possible and necessary. It remains for me only to show that a voluntary system of examinations, however well arranged (and this by unpaid examiners) is insufficient to bring about the general qualification of architects.

One might adduce many arguments, which will, however, be found well stated in the various publications on this subject,\* and I will confine myself to pointing to the experience of the Institute as the leading corporate body of the profession. After many years of discussion and postponement of the question, the Institute decided that examinations were necessary, and that so far as its own membership was concerned, no voluntary system would be sufficient, that is, to

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\* "The Proposed Act," a paper by Hugh Roumieu Gough, F.R.I.B.A., 1888; "The Legal Registration of Architects," by J. Wreghitt Cannon, F.R.I.B.A., 1888; and "The Proposed Statutory Registration of Architects," a paper by W. H. Seth-Smith, 1886, &c., &c.

establish confidence on the part of the public in the qualifications of every member. It was accordingly determined that after a certain date the door must be closed to all, excepting to those who could pass examinations. But the Institute recognised the fact that it would be unfair to exclude those who had established a practice under the old system, and they were accordingly invited, in the interval, to join the ranks in all grades of membership.

The objects sought by, and the principles proposed to be applied in, statutory registration are precisely those which led the Institute to establish test examinations, and then at a given time to close its doors, and we wait still to hear one reasonable argument adduced to prove that it is less desirable to apply these principles to the larger body, namely, to the profession generally, than to a body numbering not more than one-tenth of the architects of the United Kingdom, or that the operation is a difficult one. I am aware that statements have been made to the effect that the measure proposes to admit to registration, in the first instance, every person claiming such recognition, but I need only refer you to the forms of declaration on oath printed at the end of the Bill now before Parliament (which every person applying for registration would have to sign) in order to refute this flimsy misrepresentation. But one more word on the term registration. There is a very natural repugnance on the part of highly qualified and experienced men to be registered with a number of very indifferent practitioners, men who do not blush to put up on their doorplates—"Builder, Architect, and Undertaker"; but are not names, good and bad, found in the same columns of the directories? And let us recollect that when once the wall of defence is by examination erected round the profession, the degrading elements will cease to invade us; the young blood is all of good quality, while the incapable men gradually die out.

On the 31st of May 1890 the Institute carried a resolution in the following terms:—"That while not opposed to the principle of compulsory examinations as applied to those about to practice architecture, the Institute is of opinion that the difficulty of restricting, by statutory powers, the practice of architecture to those who have passed an examination is at present so insuperable that it is undesirable to make an immediate application for such powers."

What does this resolution amount to but the admission that the principle of the movement is a good one, and that if the difficulties could be overcome an Act should be passed at once?

That both the resolution and the discussion produced this impression on the minds of architects generally is proved by the wording of the memorial to the Institute published in the "Times" and alluded to in the opening of this paper. And it is equally clear that as the present Bill never for a moment contemplated the absolute restriction of practice to those who had passed the examination, but merely aims at enabling the public to discriminate between properly qualified and unqualified persons, the "insuperable difficulty" does not and never did exist.



But I incidentally referred just now to the architects and surveyors holding public appointments under the municipal, urban, and rural authorities, and it may interest you to learn how the present measure proposes to deal with the immensely important point of their proper qualification; clause 28 makes it unlawful for "any city, borough, or township, urban or rural authority, county council, vestry, or board of works, to appoint any unregistered person to any office in the performance of the duties of which he shall have to prepare, examine, approve, or pass plans of buildings and their constructional or sanitary arrangements; or to examine or report upon buildings erected or to be erected, so far as concerns their structural or sanitary arrangements, or so far as concerns their safety from fire or their convenience of exit or entrance, or as far as concerns buildings which are or are alleged to be dangerous structures." "But in cases where such appointments are held at the passing of this Act by persons not qualified to be registered under this Act, such person may register within six months of the passing of this Act by virtue of them holding such appointments."

I will not now do more than hint at the immense impetus which such a provision would incidentally give to architecture, but will close by giving one or two reasons why Parliament may be expected to pass such a Bill. Firstly, there are, as precedents, about a dozen Acts registering other professions; secondly, the State, in granting a charter conferring upon the Institute the right to examine on these lines, has admitted the principle for which we contend; thirdly, that without the creation of a general council of education such as any Act of Parliament would create, the public can have no guarantee that the Institute's examinations constitute a satisfactory test; fourthly, that until the State has secured the qualification of the 10,000 architects of Great Britain, whose proper function it is to devise and to superintend the sanitation of the dwellings of the community, it is preposterous (I use the term in its strictly etymological sense) to pass enactments to promote, or to impose penalties for the breach of, the sanitary condition of our houses; fifthly, that the law has already provided for testing the qualifications of our metropolitan district surveyors; sixthly, that the measure we seek would not (as do most other Bills protective of public health) increase the officers salaried out of the rates and taxes, but would simply qualify the existing staff at its own charges.

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Mr. Seth-Smith then proposed the following *Resolution*, which was seconded by Dr. George Reid (Stafford):—

"That this meeting cordially approves the principle of the statutory examination and registration of architects in the interest of the public health."

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## DISCUSSION.

**Mr. Arthur Cates, V.P.R.I.B.A.** (London), who spoke at the invitation of the Chairman, agreed with much that Mr. Seth-Smith had said, but considered that the object of the paper was to support the Architects' Registration Bill lately before Parliament. The only ground upon which the question could be justly considered in this Congress was that indicated in the clause (28) of the Bill which had been read by Mr. Seth-Smith, and which provided for the qualification of certain public officers. Such a question might properly be dealt with by the heads of the State, but should not be introduced in a Bill promoted by private persons. The Institute of British Architects had long pressed on the Government the necessity of legislation to secure adequate qualification of officers holding sanitary appointments, and had itself held efficient examinations; but the Bill should not obtain the support of the meeting merely because of that clause. He thought that the general question raised was not suitable for the consideration of the section. The chartered representative body of the architects' profession had resolved that the time had not come for proceeding with registration. The question was one for discussion by the profession whose interests it most closely touches. That profession was only now being formed, and until it had become further advanced and consolidated registration was inexpedient. Almost insuperable difficulties attended the operation of registration, and these were demonstrated by the progress of the Bill, which first proposed to include engineers and surveyors as well as architects. The two former were excluded at the instance of their respective institutes. The legitimate ambition of architects was to attain to the dignity of R.A., *i.e.*, "Royal Academician." The Bill, if passed, would create 10,000 R.A.'s—"Registered Architects." In conclusion, he urged the meeting not to intervene in a strictly professional matter, and not to pass a resolution intended to support a Bill which, in the opinion of many prominent members of the architect's profession, would be detrimental to the best interests of the profession and the art.

**Mr. Mark H. Judge, A.R.I.B.A.** (Paddington Vestry), did not think that Mr. Seth-Smith had made out a case for limiting the practice of architecture to persons possessing diplomas of efficiency and registered under Act of Parliament. The private practice of architecture could not be compared with the practice of medicine. In the latter, all was dependent on the skill and knowledge of the medical man; but in the former there was a supervision on the part of the State (through public surveyors) whereby the public were protected in all essential matters. Were the case otherwise, there would be much to say in favour of the registration advocated by Mr. Seth-Smith. With regard to public officers he agreed with what Mr. Cates had said; he thought it time that steps were taken to protect the public against the appointment of incompetent officers, and Mr. Judge concluded by proposing the following *Resolution* :—

"That in the opinion of this Section of the Congress, architects ought to be registered as to qualification before being eligible for any public appointment."

This was seconded by Mr. W. J. Fletcher, F.R.I.B.A., of Wimborne.

**Mr. Seth-Smith** briefly replied, after which the two resolutions were put to the meeting. That proposed by Mr. Mark Judge was carried without a dissentient. That proposed by Mr. Seth-Smith was carried by a majority of eight, the numbers voting being 22 for and 14 against; several of the members present did not vote.

## **The Education, Training, and Status of Sanitary Inspectors.**

BY

GEO. REID, M.D., D.P.H., Medical Officer,  
Staffordshire County Council.

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The local sanitary administration of this country is conducted by district authorities or boards, who are appointed by the rate-payers. In extent, the districts, both as regards area and population, vary considerably, and they are classed as urban and rural, the distinction being dependent broadly on the density of the population.

Recently, County Councils have been instituted, to whom certain limited sanitary powers have been intrusted over large areas embracing a number of authorities, and the whole organisation is under a controlling central authority, the Local Government Board.

The district authorities appoint medical officers of health, who are their responsible advisers on matters relating to the health of the people. In addition to these, inspectors of nuisances, or, as by preference they might be called, sanitary inspectors, are appointed; and it is with the education, training, and status of these latter officers that this paper is concerned.

By way of economising time, and for the information of those present who may not be familiar with the duties of a sanitary inspector, I would compare them with those of a police officer, substituting disease in one case for crime in the other. A little reflection on these lines will convey an idea of the varied, the responsible, and in many cases the dangerous nature of the calling; and it will at once become apparent that special knowledge, training, and experience, are indispensable requirements in such an officer. To efficiently discharge his duties it is essential that, intellectually, he should at least be entitled to take an average place, and that, technically, he should possess, at any rate, an elementary knowledge of the various conditions upon which the hygienic well-being of the community is dependent, including the physical law, that govern all sanitary operations.

An inspector then ought to know enough of physics in relation to air and water to enable him to understand the principles upon which proper ventilation, warming, water-supply, and drainage are dependent. He ought to be familiar with physiology to an extent that will make intelligible the influence that impure air, impure water, and general insanitary surroundings exercise on the usual healthy functions of the body. The conditions upon which the origin and spread of infectious disease are dependent, and the best means of counteracting these, ought to form a part of his stock of knowledge. As a guardian of the food-supply, it is necessary that he should be able to recognise unsound meat, a duty which entails a knowledge of the diseases to which animals are liable, and the signs of these in the carcass, as well as of the evidence of putrefactive changes in food, both animal and vegetable. The operations of certain



trade processes that are likely to give rise to nuisances must be known to him, so that he may advise his authority of cases in which the law that governs these is being abused. And lastly, he must know the provisions—so far as they relate to his duties—of the Public Health and other Acts that govern the sanitary administration of the country. In short, if the detailed duties of a sanitary inspector mean anything at all they entail the possession by him of an amount of technical knowledge that, as I have already remarked, can only be acquired by special study and training. To this technical knowledge must be added a good general education that will enable him to properly keep the necessary books and records; and by no means the least important of his requirements are tact and common sense.

It is such a man, and only such a man, who can be of real service as the right hand of the medical officer of health whose instructions it is his duty to carry out.

I would here remark that in England, as regards the relationship of the two officers, this is the inspector's recognised position; and, from the nature of his duties, it is difficult to conceive how it could well be otherwise, although in Scotland it would appear to be so. There the two offices have hitherto, theoretically at any rate, been looked upon as distinct and independent; and, only recently, the relative position of the officers has been the subject of considerable discussion in that country, a body of sanitary inspectors having petitioned against the adoption by a county authority of certain byelaws, with the result that the byelaws in question, which sought to establish the same relationship between the medical officer and inspector as is recognised in England, were modified to an extent which, unfortunately, leaves matters much in the same position as before.

One of the arguments used by the petitioning inspectors was, that by reason of the two offices being independent, in the event of the action of the inspector being questioned the medical officer could with greater force be appealed to in his support. This, to my mind, is one of the strongest arguments against the proposition, for, supposing the medical officer's views should differ from those of the inspector, the authority, in the conflict of opinion, would have to act for themselves. What, too would be the effect of such independence in large districts under one medical officer, but under several inspectors, each differing from the others, possibly, in the advice given to the sanitary authority with regard to similar conditions?

Time will not allow of more detailed argument with reference to this branch of the question. I have introduced it, in the first place, in order to give any Scotch medical officers or inspectors who may be present an opportunity of ventilating their opinions in discussion afterwards, and secondly, by way of protest against the establishment of a principle which, in my opinion, is essentially opposed to ideal sanitary administration. There must be no dual responsibility; otherwise, sooner or later, difference of opinion and consequent friction is certain to arise.

In order to ascertain the present position as regards the details of administration for inspection in the various sanitary districts of England,

I recently sent circulars to each inspector in Staffordshire—including those of county boroughs—containing questions with reference to the previous position and training, salaries, duties, and conditions of appointment in each case. I selected Staffordshire, partly because of my official connexion with the county, and partly because of the fact that its population is both agricultural and manufacturing. In addition to this, I obtained the same information from a town of upwards of 400,000 inhabitants, which may be taken as an example of most large towns. This information has been condensed into tabular form for convenient reference; the details, however, are too numerous to admit of more than a cursory analysis.

In the first place, with regard to urban districts (Tables I., II., III., and IV., *post*). In the case of the large town (Table I.) selected as an example, there is a head qualified inspector who receives a salary of 250*l.* a year, and included in his duties is inspection under the Sale of Food and Drugs Act. He has 23 assistant inspectors under him, whose duties are distributed as follows:—Health department 16, smoke department 4, dairies, cowsheds, and milk shops 1, canal boats 1, and lodging-houses 1; they are not qualified, and they receive from about 70*l.* to 90*l.* a year.

In the four towns with populations exceeding 50,000, it will be found on referring to Columns 3, 6, and 7, that in one case the sanitary inspection is in the hands of one man, in two cases there are two inspectors, and in the other the duties, including inspection under the Sale of Food and Drugs Act, are divided among three. The salaries in these cases range from 104*l.* to 140*l.*

In the next group, consisting of five towns with populations of under 50,000 and over 30,000, the conditions, except with regard to assistance, are very much the same.

In the following group (Table II.), composed of five towns with populations of between 20,000 and 30,000, while the salaries are about the same, the duties are increased by extraneous work.

Excluding the large town then, it may be said that the salaries in towns of under 50,000 and over 20,000 amount to about 2*l.* a week—the wages of a skilled artizan.

Further down in the table, among the smaller towns, the salaries paid are extremely erratic in amount, and extra duties of a varying nature are imposed. Take for example No. 18, a town with a population approaching 20,000 where the inspector receives 35*l.* a year, as compared with No. 35, a town with under 6,000 inhabitants where the inspector's salary is 80*l.* a year. The contrast is still more marked owing to the fact (Column 7) that, in the former case the salary is made up to 95*l.* by the additional appointment of rate collector, while in the latter it is supplemented to 365*l.* in payment for extra work as surveyor, engineer of a water-works, and inspector of a rural district, and as in this case the officer has to provide himself with assistants, doubtless, the salary paid is not more than the work deserves.

The last example I would call attention to is the district last on the list (Table IV.) where the inspector is also rate collector at a joint salary of 35*l.* a year.

In less than one half of the districts only, is the tenure of office permanent.

As shown in Column 10, in only nine out of the 39 examples did the inspector possess any knowledge of his duties previous to his appointment, and in only three instances are any definite conditions as to previous knowledge imposed on candidates although, it is but fair to note, that in many cases no recent vacancy has occurred, the present officers having held their appointments for many years. In the case of those districts in which appointments have been made within the past five years we find that of 17 such (excluding one for which there is no return) only in six did the inspector possess any knowledge of his duties.

With regard to the previous occupations of inspectors (Column 11) they are too varied to enumerate. Policemen, rate collectors, clerks, and farmers form the bulk of them.

In addition to the information given in the table, my inquiry included the following question:—"Are you of opinion that you can "efficiently discharge your duties as inspector, or, do you consider that "your district is too extensive, or, that other duties (if you have any) "occupy too much of your time?" For obvious reasons I have not included in the table the answers given to this question, but I may state that out of 17 replies from towns with over 15,000 inhabitants, 12 inspectors admitted their inability to perform their duties, the reason given, in four instances, being, that the supervision of refuse-removal (work which might well be intrusted to an assistant) occupied too much of their time.

That so many negative replies to this question should have been received is not surprising when we find (Column 8) that the range of population intrusted to one man—without the imposition of other duties—varies from above 50,000 to about a quarter that number, showing, either, that in the one case the work is excessive, or, in the other, too small. So much for urban districts.

With regard to rural districts (Tables V. and VI.) I have taken area in place of population as a basis for classification. Columns 3, 6, and 7 indicate, that the salaries paid vary greatly without regard to the size of the districts; also, that in a large proportion of cases, other duties, such as those of inspectors of urban districts, rate collectors, school attendance officers, vaccination officers, &c., are combined. In four instances only is this not the case, and, oddly enough, two of these, namely 17 and 18, are the smallest districts.

In many cases too, the emoluments from extraneous work form the greater portion of the joint salaries. In the case of three districts, namely, 9, 14, and 16, not only is other work allowed, but no limit seems to be placed upon it, the additional occupation in one case being "various," in another that of an architect, and in the third that of a house and estate agent.



In no cases are travelling expenses provided.

In every case the County Council grant is taken advantage of.

In one case only (No. 11)—which embraces the appointment of surveyor and inspector of an urban district—is any specified previous knowledge required; and again, as in urban districts, the men selected have usually been policemen, farmers, clerks, &c.

In replying to the question whether the duties can be efficiently performed, no fewer than 10 of the 18 rural inspectors answer in the negative; some calling attention to the fact that other duties occupy too much of their time, although, at the same time, they say that if these were taken away little would be left of the inspector's portion of the salary after paying expenses. To put the matter plainly, the views of the local authorities may be expressed as follows:—"There are certain appointments that must be made involving duties that must be done. Here is an appointment, the duties of which are less defined; let us tack it on to the others to make up one man's salary, and, if he has any spare time after doing his regular work, he can devote it to sanitary inspection."

So far as I have been able to ascertain, the sanitary administration for inspection in other countries does not admit of comparison with that in England. In Germany, for example, lay inspectors do not exist—except for the purpose of factory inspection—the general sanitary administration being in the hands of specially qualified medical officers, who are appointed for life by central governing bodies. In addition to the supervision of everything connected with the care of public health, they have other duties to perform, such as public vaccination, medico-legal inquiries, and official visits to schools, prisons, private lunatic asylums, and hospitals.

The details of organization in one State differ from those in another. The kingdom of Saxony, for example, is divided into 34 "medical districts," varying in extent from 740 to 222,300 acres, and from 9,000 to 350,000 inhabitants. My informant states, that, unfortunately sanitary inspectors do not exist.

The Archduchy of Hesse, with an area of over 1,800,000 acres (about the size of the West Riding of Yorkshire), and a population of about 1,000,000, is divided into 18 sanitary districts, the populations of which vary from 30,000 to about 120,000—the most populous districts being those in which large towns are situated. Each medical officer has, on an average, a population of 55,000 under his charge, and the 18 medical officers have 10 assistants who are not attached to any particular districts. The salaries of the medical officers vary from 120*l.* to 240*l.*, and of the assistants from 30*l.* to 50*l.* My informant states that the sanitary administration appears to be satisfactory, although some of the authorities show a want of interest in sanitary questions—a characteristic of which we may have a few examples in this country.

The Archduchy of Baden is divided into districts of from 10,000 to 105,000 inhabitants, each district having a medical officer, and, in the case of the large districts, an assistant medical officer. The medical

officer receives from 200*l.* to 300*l.* a year. Here the working of the system is said to be "useful, salutary, and satisfactory."

The kingdom of Wurtemberg is divided into 64 districts, with an average population of 31,000. Each district has a Medical Officer of Health, and in addition, there are seven "Medical Associates" of the Medical Board—a body, part of whose duty it is to visit the various districts periodically. Eight such visits are made every year, so that each district is visited once every eight years. The organization in this case is said to have been satisfactory since the custom of visits by the Medical Board was established.

The sanitary administration of the kingdom of Bavaria, apart from the fact that there are no lay inspectors, would seem to resemble that of this country in that it is divided into eight "Government Districts" corresponding to our counties, each having a "Medical Councillor," and into 152 "Local Districts," with an average population of 30,000, under the supervision of a District Medical Officer. In addition to these officials there is a "Chief Medical Councillor." The salaries of the District Medical Officers vary from 90*l.* to 140*l.* a year, those of the Government Medical Councillors from 245*l.* to 288*l.*, and that of the Chief Medical Councillor from 300*l.* to 350*l.*—the amounts varying in accordance with length of service. Here the organization is said to have proved satisfactory on the whole.

In addition to their salaries, Medical Officers of Health throughout Germany receive fees for public vaccination; and although they are not allowed to hold other public appointments they may undertake private practice, but, it is said, that their official duties occupy most of their time.

In France sanitary organization is at present being considered, and a Bill has been submitted to the Chamber of Deputies by a "Consultative Committee on Hygiene," which is said to provide for a complete sanitary service, founded partly on information furnished by foreign sanitary institutions. At present there are from 10 to 15 districts, and the sanitary officials, each of whom has one assistant, are the Professors of Hygiene in the Schools of Medicine at Paris, Lille, Nancy, Lyons, Bordeaux, and Montpellier. I am told that these officials have only existed since 1887, and that, so far, they have not rendered much service, their functions not being sufficiently well defined. The salaries of the head officials are 240*l.* a year in addition to that which they derive from other public appointments. Each "arrondissement" also has a recognised medical officer whose duties seem to be "to make investigations and draw up reports on epidemics."

To return to England, I think the system of lay inspection, in principle, is an admirable one, but I have said enough to indicate that reform in detail is necessary.

In the first place, it ought to be a condition of appointment that all candidates should furnish evidence, in the shape of a recognised diploma, of having acquired a knowledge of their duties. This diploma, in my opinion, ought not to be granted unless the candidate can satisfy the

examiners that he possesses a practical, in addition to a theoretical knowledge of these duties, by previously having been either a pupil or an assistant under a qualified inspector or surveyor. I have seen enough to convince me of the worthless nature of book knowledge only, when an attempt is made to put it into practice. Not only should practical knowledge be required as regards all future candidates, but every inducement should be offered those inspectors at present in office to qualify for the diploma. I am glad to say that I know of one town where this inducement is offered—in the shape of an increase of 13*l.* a year in the inspector's salary on his obtaining the diploma.

The question will no doubt arise as to what shall be recognised as the qualifying body; but this is a detail which at present need not be considered, although it may well be supposed that the claims of the Sanitary Institute of Great Britain, by reason of the excellent work it has done in this direction during the past 13 years, ought to receive due recognition.

As regards salaries, if we impose conditions that necessitate a considerable amount of time, and consequently money, being spent in acquiring the knowledge to fit men for the work, and this, too, in the face of the possibility that they may not be successful in the after competition for an inspector's post, it stands to reason that a reasonable inducement should be offered in return.

For the same reason greater security of tenure of office must be guaranteed. Without this security the inspector is practically at the mercy of a body of men, many of whom are directly interested in property which he may consider it his duty to condemn; to be firm and consistent in the discharge of his duties under these circumstances is more than can be expected of human nature. An inspector ought to retain his appointment so long as he efficiently discharges his duties; and, in order that this security may be guaranteed, his dismissal ought, in all cases, to receive the sanction of a controlling and independent body.

In rural districts it is unreasonable to expect the inspector to pay his travelling expenses out of the miserable pittance that is usually paid to him, and yet, without exception, in the districts embraced in my inquiry, this is the case. He ought not to be called upon to spend the greater portion, if not the whole, of his salary—which he must do if he does his work—in providing a conveyance to enable him to cover the ground.

The districts, too, under the supervision of one inspector, as regards area in some cases and population in others, are much larger than he can possibly undertake. This fault can be rectified by providing him with assistance; but, in other cases, the districts are too small to support a properly qualified and well paid official. This also is capable of adjustment, although at present I must not attempt to indicate by what means. I would merely throw out the suggestion that the appointment of Registrars of Births and Deaths in the smaller districts, which at present are almost exclusively held by shopkeepers and others whose occupations are in no way allied to such duties, might more reasonably be held by inspectors, under the control of medical officers, and thus



serve the purpose of amplifying their incomes from a more appropriate source than is usual at present. Moreover, the inspection of dairies and cowsheds and canal boats, which is so frequently entrusted to police officers and others quite unfitted for the duties, ought, in all cases, to be in the hands of sanitary inspectors.

In conclusion I would now simply add, by way of emphasizing what I have already said, that, having recently had many opportunities of judging of the work done by sanitary inspectors in various districts, the necessity which I had previously felt to exist for radical reform in that department of sanitary administration has been amply confirmed. The undoubted evidence of good work, in districts in which the inspector proves to be a man who takes an intelligent interest in his work and exerts himself to acquire a knowledge of his duties—and this, too, in the face of little encouragement from those in authority, for whose approval he certainly is entitled to look—testifies to the good that must necessarily follow wise reform. If the inspectors with whom I have come in contact in Staffordshire may be taken as a type of those of other counties, I believe that any effort in the direction of increasing their facilities for becoming more efficient officers will receive at their hands most cordial support. In proof of this I may mention that, as the outcome of a course of lectures, given by myself in the first instance, and of a second course, given under the auspices of the Sanitary Institute, in which I had the kind assistance of various specialists, no fewer than 26 out of 52 inspectors in the administrative county have entered for an examination with the view of obtaining the diploma of the Sanitary Institute.

I have strung together in this paper certain facts by way of illustrating the weak points of the present sanitary administration, and I have indicated the lines on which, in my opinion, reform ought to proceed. The facts can be relied upon, although the suggestions may be open to criticism. I trust that what I have said may provoke a discussion among those present which will impart a wholesome stimulus to the powers that be, and thus assist in bringing about—let us hope in the near future—a change for the better in the present order of things.

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TABLE I. (URBAN).

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
Classification as to Population.	Number of Districts corresponding to Name in Returns.	Salary.	Whether paid by County Council.	Appointment, Annual or Permanent.	Other Appointments held by Inspector.	Extra Salary for other Appointments.	Number of Inspectors in the District.	Length of Time in present Appointment. Years. Months.	Was similar Appointment held before?	Occupation previous to First Appointment as Inspector.	Previous Special Knowledge, Training, or Experience required in Candidates.
Under 500,000 and over 400,000.	1	250	Yes	P.	Food and drugs inspector* -	Inclusive	One, and 24 assistants.	9	0	Assistant Inspector.	Building knowledge and certificate of Sanitary Institute.
	2	140	No	P.	Food and Drugs Act -	"	One, and two do.	20	0	No	In future, probably.
Under 100,000 and over 50,000.	3	115	No	P.	Nil*	"	One, and assistant.	0	10	Assistant Inspector. Yes	(No return.)
	4	120	Yes	A.	Nil	"	One	1	6	Fanner	Yes.
	5	104	No	P.	Nil	"	Two	1	6	Assistant Inspector.	Good general knowledge of duties.
	6	120	No	A.	Market inspector and Superintendent fire brigade.†	"	One	7	0	No	Nil.
Under 50,000 and over 30,000.	7	100	No	P.	Nil*	"	One	0	3	Assistant Inspector.	Previous experience pertaining to duties.
	8	110	No	P.	Nil*	"	One	10	0	No	Nil.
	9	100	Yes	A.	Nil*	"	One	4	0	No	Nil.
	10	150	Yes	A.	Nil†	"	One	15	0	Assistant Inspector.	No condition; but present inspector holds Sanitary Institute certificate.

\* Dairies, cowsheds and milkshops, and canal boats.

† Dairies, cowsheds, and milkshops.

TABLE II. (URBAN).

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
Classification as to Population.	Number of Districts corresponding to Name in Returns.	Salary.	Whether One-half paid by Council.	Appointment, Annual or Permanent.	Other Appointments held by Inspector.	Extra Salary for other Appointments.	Number of Inspectors in the District.	Length of Time in present Appointment.	Was similar Appointment held before?	Occupation previous to First Appointment as Inspector.	Previous Special Knowledge, Training, or Experience required in Candidates.
		£						Months.			
								Years.			
Under 30,000 and over 20,000.	11	110	No	P.	Nil*	Inclusive	One	13	No	Potter	Nil.
	12	100	No	P.	Market inspector	20l.	One	8	Assistant Inspector.	Gas-fittings maker	Special knowledge of sanitation.
	13	120	Yes	A.	Nil*	Inclusive	One	15	No	Colliery manager.	Nil.
	14	100	Yes	For 5 years.	Payment of wages of scavengers.*	"	One	17	No	Iron worker	Nil.
	15	120	No	A.	Market inspector*	"	One	16	No	Clerk	Nil.
Under 20,000 and over 15,000.	16	100	No	A.	Manager of manure works†	"	One	3	No	No return	Nil.
	17	90	No	P.	Nil†	"	One	18	No	Police officer	Nil.
	18	35	No	P.	Rate collector†	60l.	One	1	No	Rate collector	Nil.
	19†	100	Yes	For 3 years.	Surveyor*	100l.	One	14	No	Contractor	Nil.
	20	230	No	P.	Surveyor†	Inclusive	One, and office boy.	17	No	Land and building surveyor.	Nil.

\* Dairies, cowsheds and milkshops, and canal boats.

† Dairies, cowsheds, and milkshops.

‡ Practically Urban District as regards area.



TABLE III. (URBAN).

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
Classification as to Population.	Number of Districts corresponding to Name in Returns.	Salary.	Whether paid by County Council.	Appointment, Annual or Permanent.	Other Appointments held by Inspector.	Extra Salary for other Appointments.	Number of Inspectors in the District.	Length of Time in present Appointment.	Was similar Appointment held before?	Occupation previous to First Appointment as Inspector.	Previous Special Knowledge, Training, or Experience required in Candidates.
		£						Yrs.	Months.		
Under 15,000 and over 10,000.	21	115	Yes	P.	Nil*	Inclusive	One	9	No	Builder's manager	Nil.
	22	65	Yes	A.	Nil†	"	One	5	No	Boat steerer	Nil.
	23	100	Yes	P.	School attendance officer†	25%.	One	17	No	Engineer's agent	Nil.
	24†	50	Yes	A.	Nil†	Inclusive	One	5	(No return)	Farmer	Nil.
	25	60	No	A.	Rate collector*	10%.	One	0	No	Clerk	In last appointment, selected candidate undertook to obtain certificate of Sanitary Institute within 12 months.
Under 10,000 and over 5,000.	25†	75	Yes	A.	Surveyor*	100%.	One	3	Under Borough surveyor.	Assistant Borough surveyor.	Nil.
	27	25	Yes	For 3 years.	Inspector of rural district; vaccination officer.	160%.	One	14	No	Police officer	Nil.
	28	100	Yes	For 2 years.	Assistant clerk and collector of rates,†	Inclusive	One	14	No	Clerk	Nil.
	29	60	No	P.	Surveyor and rate collector*	"	One	13	No	Land surveyor	Nil.
	30	50	No	P.	Collector of rates*	"	One, and assistant.	1	Yes	Rate collector	Nil.

\* Dairies, cowsheds and milkshops, and canal boats.

† Dairies, cowsheds, and milkshops.

‡ Practically Urban District as regards area.

TABLE IV. (URBAN).

1. Classification as to Population.	2. Number of District corresponding to Name in Returns.	3. Salary.	4. Whether paid by Council. One-half County	5. Appointment, Annual or Permanent.	6. Other Appointments held by Inspector.	7. Extra Salary for other Appoint- ments.	8. Number of Inspectors in the District.	9. Length of Time in present Appoint- ment.		10. Was similar Appoint- ment held before?	11. Occupation previous to First Appointment as Inspector.	12. Previous Special Knowledge, Training, or Experience required in Candidates.
								Years.	Months.			
Under 10,000 and over 5,000— <i>cont.</i>	31	35	Yes	For 3 years.	Nil* . . . .	Inclusive	One	5	0	Yes; previously in same district. Yes	-	Nil.
	32	37	Yes	A.	Surveyor and rural inspector, and at liberty to undertake other work.*	1377. 10s.	One	13	0	Yes	Borough surveyor's assistant.	Nil.
	33†	35	Yes	A.	Surveyor* and collector of rates.*	557.	One	6	0	Yes	Surveyor and collector.	General knowledge of Public Health Act.
	34	78	No	P.	Surveyor and clerk of works of sewage scheme.*	527.	One, and assistant.	0	2	No	Borough surveyor's pupil.	Ordinary amount of knowledge and experience.
	35	80	Yes	A.	Surveyor of urban and rural districts and engineer of waterworks.	2857.	-	0	8	Yes	Civil engineer and surveyor.	Nil.
Under 5,000 and over 2,000.	36	78	No	P.	Road surveyor and rate collector.	Inclusive	One	23	0	No	Factory manager	Nil.
	37	33	Yes	A.	Surveyor†	507.	One	0	9	No	Clerk	Nil.
	38	35	Yes	For 3 years.	Collector of rates†	257.	One	3	0	No	Accountant	Nil.
	39	35	No	P.	Surveyor and rate collector†	Inclusive	One	4	0	No	Butcher	Nil.

\* Dairies, cowsheds, and milkshops.

† Practically urban district as regards area.

‡ Dairies, cowsheds and milkshops, and canal boats.

TABLE V. (RURAL).

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
Classification as to Area.	Number of District corresponding to Name in Returns.	Salary.	Whether paid by Council.	Appointment, Annual or Permanent.	Other Appointments held by Inspector.	Extra Salary for other Appointments.	Number of Inspectors in District.	Length of Time in present Appointment.	Was similar Appointment held before?	Occupation previous to First Appointment as Inspector.	Previous Special Knowledge, Training, or Experience required in Candidates.
		£						Years.			
								Months.			
Under 90,000 and over 80,000.	1	215	Yes	A.	No reply*	Inclusive	One	8	Borough surveyor for 16½ years, and inspector for 3½ years.	Land surveyor	Competent to make plans, &c., sewage works, and sanitary engineering.
Under 70,000 and over 60,000.	2	135	Yes	For 3 years.	Vaccination officer and inspector of urban district.†	50 <i>l</i> .	One	14	No	Police officer	Nil.
	3	100	Yes	A.	Nil	Inclusive	One	18	Yes	Relieving officer, and registrar of births and deaths.	Nil.
	4	84	Yes	A.	Nil*	"	One	3	Yes	Builder	Nil.
	5	100	Yes	A.	Surveyor and inspector of urban and rural districts, and can do other work.†	74 <i>l</i> . 10 <i>s</i> .	One	5	No	Assistant to a borough surveyor.	Nil.
	6	75	Yes	A.	School attendance officer and vaccination officer.†	47 <i>l</i> .	One	3	No	Clerk	Nil.
Under 60,000 and over 50,000.	7	160	Yes	A.	Collector of rates and taxes†	Inclusive	One	17	No	Farmer	Nil.
	8	77	Yes	A	Surveyor and various†	"	One	12	No	Builder's foreman	Nil.
	9	65	Yes	A.	Vaccination officer, school attendance, and inquiry officer.†	70 <i>l</i> .	One	10	No	Coal merchant	Nil.

\* Dairies, cowsheds, and milkshops.

† Canal boats only.

‡ Dairies, cowsheds, milkshops, and canal boats.



TABLE VI. (RURAL).

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
Classification as to Area.	Number of District corresponding to Name in Returns.	Salary.	Whether One-half paid by County Council.	Appointment Annual or Permanent.	Other Appointments held by Inspector.	Extra Salary for other Appointments.	Number of Inspectors in District.	Length of Time in present Appointment.	Was similar Appointment held before?	Occupation previous to First Appointment as Inspector.	Previous Special Knowledge, Training, or Experience required in Candidates.
Under 50,000 and over 40,000.	10	120	Yes	A.	Surveyor of urban and rural district, engineer, and manager of waterworks.*	24 <i>l</i> .	One, and assistant.	11	Yes	Civil engineer and surveyor.	Yes.
	11	135	Yes	For 5 years.	School attendance officer†	40 <i>l</i> .	One	18	No	Sergeant instructor to volunteers.	Nil.
	12	90	Yes	A.	School attendance officer†	25 <i>l</i> .	One	6	No	Police officer and school attendance officer.	Nil.
Under 40,000 and over 30,000.	13	80	Yes	A.	Nil, allowed to practice as architect.*	Inclusive	One, and assistant.	8	No	Architect and surveyor.	Nil.
	14	185	Yes	P.	Nil†	"	One	19	No	Builder's foreman	Nil.
	15	62	Yes	A.	House and estate agent*	"	One	15	No	Clerk, rent collector, house agent, &c.	Nil.
10,000	16	70	Yes	A.	Surveyor of buildings*	10 <i>l</i> .	One	0	Yes	Carpenter and joiner.	Yes, but not specified.
	17	100	Yes	A.	Nil*	Inclusive	One	16	No	Surveyor and contractor.	Nil.
	18	60	Yes	For 3 years.	Nil*	"	One	20	No	Farmer	Nil.

\* Dairies, cowsheds, and milkshops.

† Dairies, cowsheds, milkshops, and canal boats.

## **The Education, Position, and Duties of Plumbers.**

BY

Professor GARNETT, Principal of the Durham College of Science; and  
Dr. VACHER, Medical Officer of Health, Birkenhead.

*Read by the Master of the Worshipful Company of Plumbers,*

MR. W. H. BISHOP.

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THE EDUCATION OF THE PLUMBER.—In common with other lads of the artisan class, those who enter the plumbers' craft generally leave school at a very early age, and by the time they are old enough to value the instruction they have received they have forgotten most of what they were taught. Hence not infrequently the teacher of plumbing has first to take his class through a short course of workshop arithmetic. A little practice in freehand drawing, particularly in making dimensioned sketches of apparatus connected with the plumber's craft, is very desirable; while it is of still greater importance that the apprentice should be taught how to "read" a working drawing with the meaning of plan, elevation, section, &c. Having mastered these elementary principles, he proceeds to practical applications of his knowledge. He should be taught to mark off the lining for an oblong sink with sloping sides. The elements of mechanics, including strength of materials, of hydrostatics and hydraulics in their application to water seals, the flow of water in pipes, and other every-day problems, the effects of heat and cold on water and on lead, the chemistry of air, water, lead, zinc, iron, and copper, and the action of fluxes in soldering, the nature of combustion and respiration, the principles of ventilation, and the character and mode of propagation of zymotic diseases, are all items of scientific knowledge which the plumber cannot afford to neglect. The science subjects required by the plumber's apprentice may therefore be enumerated as mathematics, practical geometry, machine drawing, theoretical mechanics, applied mechanics, inorganic chemistry, heat, and hygiene, and to these may with advantage be added electricity and freehand drawing; and when he has mastered all these there remain the applications of the scientific principles to the practical details of his craft.

Attempts to teach plumbers side by side with apprentices belonging to other trades in ordinary science classes have not met with encouraging results. The only satisfactory method consists in teaching the plumbers most of what they require to know in a class by themselves, illustrating every scientific principle by examples derived from the plumbers' every-day work, and to the majority of the apprentices giving instructions only in those parts of a science which are immediately applicable to the practice of their craft.

There is no reason why a lad's powers of observation and of reasoning should not be called into play as well by the study of special branches of half-a-dozen sciences as by his more thorough devotion to

all the branches of one or two. Of course it would be more satisfactory if all the sciences touched upon could be mastered systematically and thoroughly, but an apprentice's life is short, and when from that life there are deducted between 50 and 60 hours a week for the workshop, the hours available for study are very few. Only the winter evenings are available for class work, and it therefore becomes necessary to extend the course of instruction throughout the whole term of apprenticeship. On so long a road it is necessary that some milestones should be placed to encourage the traveller and mark his progress. To this end the Worshipful Company of Plumbers has drawn up a graded syllabus of instruction corresponding to preliminary, intermediate, and final courses, and has arranged to conduct an examination at the end of each course, and to give a certificate to all who satisfy the examiners. There will thus be three grades of certificates for journeymen and apprentices, and those who satisfy the examiners in certain additional subjects in the final examination become eligible for a masters' certificate, making four grades of certificates in all. At the end of his first or second year of apprenticeship the young plumber should obtain the preliminary certificate. This marks a certain standard of efficiency, and he will not again have to pass an examination in the more elementary subjects of the preliminary course. Such a certificate should have a commercial value as indicating on the part of the holder both capacity and industry. A year after taking the preliminary certificate the intermediate examination should be passed, and the second certificate obtained. At the end of his apprenticeship the young improver should be able to pass the final examination on the result of which the certificate of registration is given with the title of registered plumber, and in certain cases of honour men, the Freedom of the Plumbers' Guild of the City of London is granted in addition. The graded syllabus of instruction and the examination questions set last May for the *preliminary* certificate are appended to this paper.

The next question is the character of the teacher, and it may be assumed that it is very undesirable to employ a large number of teachers for one class of students. A practical plumber holding a high position in the estimation of the local trade, and possessing thoroughly scientific knowledge and the power of imparting it, is far the best teacher; and where such a man can be found his services should, if possible, be secured at any cost and utilised to the utmost in the conduct of as many classes as possible in the more important towns of the district. Unfortunately, men possessing these qualifications are very difficult to find, and still more difficult to secure for educational purposes, and when they are not available the best substitute is an experienced teacher of considerable scientific attainments, who has had some experience of workshop life, who understands the habits and modes of thought of artisans, and who will take the trouble to learn the nature of the work which the plumber has to carry out, and the conditions which determine its efficiency. A teacher who has so far mastered mathematics and mechanics as to be able to put the most advanced conclusions in the simplest form, who has a sound knowledge of physics and chemistry, and who has had some



training in an engine works or in any other mechanical trade may, by the careful study of such works as those of P. J. Davies, J. W. Clarke, S. S. Hellyer, W. P. Buchan, W. R. Maguire, and others, and by keeping his eyes about him, readily fit himself to teach all that is required except workshop practice. This last must, of course, be dealt with by a practical plumber, and it is very desirable that the whole course of instruction should be under the general direction of a committee of plumbers. If within the next few years classes for plumbers are to be conducted at all commensurately with the requirements of the country, the provision of normal classes for teachers in two or three important centres where special facilities exist should at once engage the attention of local authorities.

It may be asked whether the methods here advocated should be followed in providing technical instruction for those engaged in all other mechanical industries. In reply it may be stated that it is both unnecessary and impossible to provide such instruction for all the rank and file of most trades. The plumber's position is *exceptional* on account of (1) the great degree of *individual* responsibility resting on the *ordinary journeymen*—(2) the enormous public interest involved.

The greater part of the skilled labour of this country is performed in factories, engine works, shipyards, and similar establishments, under the direct supervision of a foreman, overman, shop manager, or other responsible person. All that is required of the workman is manual dexterity, and this is not to be gained in the technical class. Generally there is little room for thought or originality. All the thinking has to be done by the few who are responsible for design or management, and unfortunately, it is sometimes believed to be to the interest of the employer even to discourage thought on the part of the workman. In such cases there is still room for technical instruction in order that the workman may take an intelligent interest in his work, and that the few of exceptional ability and ambition may qualify themselves to occupy positions of responsibility later on. It may fairly be debated whether in many trades the ordinary journeyman would not do better by devoting his leisure hours to the study of literature or fine art than by employing them in the acquisition of the scientific principles and technology of his craft. Of course much of the plumber's work, like the engineer's, is done in the shops, under the eye of the foreman, but in his most important work the sanitary plumber is generally his own foreman. Accompanied by an assistant, the plumber enters the dwelling-house, and henceforth the health, and perhaps the lives of the household, are in his hands. Efficient inspection *after* the work is done is practically impossible. The journeyman plumber makes his own diagnosis, applies his own remedies, without even nature to help him, and finally conceals his work so that the efficiency of his treatment can only be tested by time.

In these circumstances it is obviously a necessary safeguard to the public that they should be provided with means of distinguishing who have been properly educated and have given proof of their knowledge and practical skill.

The conduct of technical classes under the direction of committees composed chiefly of members of the plumber's craft, the publication of a graded syllabus of instruction covering the whole ground required by the apprentices, and including all the branches of science which bear upon the craft, the granting of a series of certificates on the results of examinations with the final certificate of registration regarded as proof both of practical skill and scientific attainments, while essentially pioneer work, mark the greatest advance which technical instruction has yet made in this country.

*The position of the Plumber.*—Every calling which intimately concerns the health of the community should be under statutory enactments regulating the qualifications and practice of its members. Thus, a doctor must furnish proof of a long course of study, and of the possession of the necessary skill and knowledge and attainments before becoming a registered medical practitioner. So must the dentist and the pharmaceutical chemist before they receive their respective diplomas.

The plumber, who is at least as intimately associated with the health of the public and the individual as those following any other vocation, is in the unique position of being under no statutory regulation or observation. Apart from the course of instruction formulated by the Worshipful Company of Plumbers, there is no curriculum of study arranged for the plumber, no prescribed term of work at the bench, no compulsory examination in theory and practice to be passed. There are no rules to which he must conform, no wholesome disciplinary powers of which he stands in fear.

While there is no prescribed training for the plumber, no test examination all must pass, it follows that the genuine plumber must compete in the same market with the untrained and untrustworthy. Men who have never served an apprenticeship or undergone any technical training, offer to do plumbers' work and obtain employment at labourer's wages, to the manifest injury of the public and the plumber. What the genuine plumber who has spent much time and money in qualifying himself wants is some certificate or voucher giving him a recognised position, and distinguishing him from the unqualified man. What the public desire is similar, a distinctive mark telling of fitness of training, by which they will know on the best authority the masters and men who are really plumbers and may be trusted to do efficient, honest work.

The very serious extent and the continual spread of the insanitary evils associated with defective plumbing and drainage work have in recent years so far engaged public attention that the great body of the medical profession, and the sanitary authorities of the United Kingdom, have declared it to be essential to the protection and preservation of the health of the community that plumbers should be efficiently trained and educated, and should pass qualifying examinations as to their knowledge and practical skill before engaging in those branches of plumbers' work which effect the sanitary condition of dwelling-houses and other

buildings. Sir Charles Cameron, M.D., Medical Officer of health for Dublin, well expresses the opinion of the medical profession and of expert sanitarians on this topic. "It is now desirable," he says, "that persons who profess to be plumbers should be tested as to their competency to do the work of a plumber. The sanitary state of a house largely depends upon the provision made for the getting rid of waste water produced in it, and if the water-closets and sewers employed to get rid of those matters are constructed by mere handy men, labourers, &c., they are likely to be defective and injurious, rather than beneficial to health."

As regards the importance of the position of the plumber, the weighty words of Professor Armstrong (of Edinburgh University) are well calculated to arrest attention. He said :—"No one who had the slightest acquaintance with the history of sanitary science, or with the nature and extent of the incidence of disease, could for one moment entertain a doubt as to the supreme importance of the position which sound and intelligent plumbing occupied in relation to the health of every household ; for, according as the plumbing in a house was good or bad, thoughtfully or carelessly done, so was it calculated to make or mar the health of those who dwelt in it. With such heavy responsibility, and with such enormous interests at stake, it was surely not unreasonable to demand that plumbers who were entrusted with work of this kind should be just as carefully and systematically registered as medical men and lawyers were required to be." It would be easy to multiply quotations from skilled workers and writers in this connexion, but there is no need to do so. When it was thought that public opinion was sufficiently advanced to support the action of the medical profession and the leaders in the plumbers' craft, the chief sanitary authorities and others united with the Worshipful Company of Plumbers in establishing a system of training and registration in Great Britain and Ireland. After some preliminary meetings in the autumn of 1884 and in 1885, this system was commenced, and the register for duly qualified plumbers was opened in March 1886. Since that date the registration movement has been making steady progress, and it well deserves the hearty support of the community at large. In this matter public opinion has been supported throughout the United Kingdom by the members of the craft. The plumbers themselves are anxious to raise their craft into the position which it ought to occupy in the estimation of the world, and they well know that this can be effected only by the weeding out of ignorance and dishonesty. The formation of district councils for the registration of plumbers in the most important divisions of the country indicates the feeling of the members of the craft with respect to this question. Most of the district councils comprise besides masters and operative plumbers, members of local health committees, medical officers of health, leading physicians, and architects, and other representative persons. The co-operation of local sanitary authorities is of the utmost importance in the development of any system of registration, and the registration committees may in many ways render valuable aid to the local authorities. As stated by Dr. Alfred Hill, the medical officer



of health for Birmingham, "the health committees want really to make "plumbers their technical assistants." Opportunities are afforded to men of proving their knowledge and skill before competent examiners. The certificate they receive, if successful in passing the examinations, gives them a recognised standing and position not before attainable. It is important to add that a certificate thus obtained may be withdrawn from anyone who shall be convicted of doing work dangerous to health, or distinctly in contravention of what has been undertaken.

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#### APPENDIX A.

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#### *Grand Syllabus of Instruction for Plumbers.*

##### PRELIMINARY COURSE.

*To occupy One Year or Two Years according to the previous Education of the Apprentice.*

*Workshop Arithmetic.*—Duodecimals. Square Root. Mensuration of the circle, square, cylinder, cone, prism, pyramid, &c. Density of materials. Calculation of the weight of simple solids and figures made of sheet metal.

*Geometry and Drawing.*—Simple problems on the straight line, circle, triangle, and other plane figures; developable surfaces, with special reference to the cutting out of sheet lead, for the formation of elbows or knees in circular or rectangular seamed pipe, of conical trumpet mouths, and of covering for various architectural designs (all the figures may be made of paper in the class room). Elements of descriptive geometry. Meaning of plan, elevation, section, &c. Reading working drawings. (*Note.*—It is not necessary to spend time in highly finished drawings; the main object is to teach apprentices to "read" a drawing placed before them). Making rough dimensioned sketches of apparatus and plumbers' work.

*Mechanics, Hydrostatics, &c.*—Workshop appliances, such as the lever, pulley, blocks, &c. Simple applications of the principle of energy. Fluid pressure—"Head of water." Specific gravity—The Hydrometer. Barometer. Siphons and water gauges. Nature of a "water seal."

*Heat.*—The effects of heat on solids. The thermometer. Expansion and contraction of solids and liquids. Effects of hot and cold water on lead pipes. Expansion of water in freezing. Bursting of pipes, &c.

*Chemistry.*—Elementary chemical principles. Air, water and combustion. Chemical properties of lead, iron, zinc, and tin.

*General Plumbing.*—The equipment of the workshop. Plumbers' tools. Manufacture of cast sheet lead, moulded lead, seamed pipes, seamless pipes, &c. Marking off simple work in sheet lead.

*Workshop Practice.*—Marking off and cutting out sheet lead. Simple examples of lead bossing. Bending pipes up to 2-in. in diameter.

N.B.—The treatment of general plumbing in the lecture course is not intended to take the place of workshop instruction, but to supplement it. Difficult questions can be more fully explained in the lecture room than in the workshop, and should be treated as illustrations of the physical

laws and principles involved, so that the subject of general plumbing as treated in the lectures should be taught by means of illustrations distributed over all the other subjects, thus giving life and interest to the whole teaching.

#### INTERMEDIATE COURSE.

*Geometry and Machine Drawing.*—The applications of geometry to sheet lead work of a more advanced character than in the first year. Making descriptive drawings from actual pieces of apparatus.

*Freehold Drawing.*—Making dimensioned sketches of a more difficult character than in the first year.

*Strength of Materials.*—Elasticity. Imperfect elasticity of lead, and precautions necessary in consequence. Elastic limits. Safe load. Ultimate strength. Strength of pipes and boilers to resist bursting pressure. Flow of solids. Behaviour of lead under great pressure. Lead bossing. Manufacture of seamless pipes, bends, &c. Shearing and bending. Results obtained by the testing machine.

*Heat, &c.*—Expansion of gases. Gaseous laws. Conduction, convection, radiation, and absorption. Radiators for heating purposes. General principles of hot water circulation and ventilation. Effects of heat on the strength and elastic properties of lead and alloys. Heat as a quantity. † Amount of heat necessary to warm the air of a building. Heating by hot water and steam. Specific and latent heat. Melting, evaporation, and boiling.

*Chemistry.*—Water, and its impurities. Chemical properties of copper, brass, gun-metal, &c. Action of water on lead and other metals, metallic oxides. Effects of air, carbonic anhydride, acids, &c., on the chief metals used by plumbers. Litharge, red lead, white lead, &c. Fermentation, “sewer gas.” Influence of “sewer gas” on lead. Solders; their preparation, fusing points, methods of purification, &c. Fluxes: their action. Brazing. Autogenous soldering. Rust joints.

*Electricity.*—Knowledge of the elements of electricity so far as may be needed to prevent electrolysis due to the association of different metals; for the fixing of bells, and for dealing intelligently with electric light conductors and fittings.

*General Plumbing.*—First year’s course continued. Manufacture of various forms of traps and other appliances. Jointing and bending of pipes. Roof work and lead work generally.

*Workshop Practice.*—Bending pipes from 2 in. to 4 in. in diameter. Jointing lead pipes. Making seamed pipes. Soldering by various systems.

#### FINAL COURSE.

*Hydraulics, &c.*—Relation between “head” and velocity of efflux. Effect of form of orifice on velocity of efflux. “Trumpet-mouth wastes.” Resistance of pipes for water and gas. Size of pipes for given delivery with given “head.” Resistance of bends, elbows, &c. “Siphonage” and “waving out” of traps. Position of air pipes to prevent siphonage. Different forms of traps and their relative advantages. Ventilation of drains, soil-pipes, &c. Action of cowls. \*Hydraulic transmission of power. Water supply of houses. \*Water supply of towns. Design of flushing tanks and connexions. Pumps. \*Hydraulic rams for water supply.

*Heat.*—Principles of hot-water circulation. \*Details of systems for heating by hot water and steam. \*Calculation of dimensions of pipes required. \*Details of systems of ventilation. Relation between temperature and pressure of steam. \*Heating by hot water at high pressure.

*Building Construction.*—The elements of building construction with special reference to roofs, and the mode of rendering them water tight. Lead flats, gutters, flashings, soakers, &c.

*Sanitation.*—Arrangements necessary to prevent the contamination of water. Filters. \*Fermentation and sewer gas. \*Relation between ferments and zymotic diseases. General arrangement of plumbers' work in a dwelling-house, including water-supply, sinks, closets, lavatories, hot-water apparatus, ventilation of house drains, connexion with sewer, &c. \*Sanitation of public buildings. \*Systems for the disposal of sewage. The laying of drains—size, fall, material, &c. Iron drains. Trenches for drains. Peculiarities of different strata met with in underground work. Testing drains and fittings.

*General Plumbing.*—House cisterns, their construction, arrangement, and fittings. Service boxes, water-waste preventers, &c. Coating pipes internally. Construction of joints, bends, elbows, fittings, &c., with special reference to the laws of hydro-dynamics. The taking out, reading, and measuring up of plumbers' quantities, specifications, and work. Hot water for domestic purposes. Dimensions of fittings to secure the best effects. Domestic plumbing generally.

*Workshop Practice.*—Jointing pipes (more difficult examples than those given in the Intermediate Course). Manufacture of traps. Architectural work. Lead burning.

*Note.*—In carrying out this course of instruction, it is very desirable that arrangements should be made to alternate the more abstract subjects (say arithmetic, geometry, &c.) with those bearing more directly on the every-day work of the plumber, in order to render the course of study as interesting as possible. This refers particularly to the Preliminary and Intermediate Courses.

## APPENDIX B.

### THE WORSHIPFUL COMPANY OF PLUMBERS.

#### PRELIMINARY EXAMINATION.

*To obtain the Preliminary Certificate, candidates must show a fair general knowledge of the subjects referred to in the following questions. To obtain a prize, special excellence must be shown in one of the sections, A, B, C, or D. Candidates are recommended to attempt at least one question in each section, and all the questions in one section:—*

#### A.

1. How would you find the width of a strip of lead which would make a  $4\frac{1}{2}$ -inch circular seamed pipe? 2. What weight of 7-lb. lead would be required to cover a cone 6 feet in diameter at the base, and 10 feet high? 3. A cistern measures 4 feet by 2 feet 6 inches, by 2 feet. How many gallons of water will it hold, and what weight of 6-lb. lead will be required to line it? 4. A conical "trumpet mouth" is to be made in sheet lead. It is  $4\frac{1}{2}$  inches wide at the top and  $1\frac{1}{2}$  inches at the bottom, and is 16 inches long. Show how to cut out the lead so that when bent it may form the "trumpet mouth."

\* Candidates for certificates as masters will be expected to be acquainted with the subjects marked \* in the Final Course; and only those who satisfactorily answer the questions in these subjects will be eligible for Honours.



B.

5. Give a short description of a plumber's "kit," with sketches of the tools. 6. Make a dimensioned sketch of a simple wash-down basin, showing the arrangement for flushing, and the amount of "water seal" in the trap. 7. What is meant by "head of water"? A cubic foot of water contains 62½ lbs.; what head is equivalent to 80 lbs. per square inch?

C.

8. What is the effect of frequent changes of temperature on lead, nailed or otherwise secured between two points? How would you support a half-S trap under a "hopper," a "receiver," or a "container"? 9. What is the cause of lead pipes bursting during frost? What precautions should be taken to prevent the bursting of water pipes in a private house?

D.

10. How would you prepare a quantity of plumber's solder? How would you remove zinc from old solder? How does plumber's metal differ from "fine solder"? 11. Why are fluxes used in soldering, and how do they act? What is the danger of using acids or salts as fluxes? 12. What use is made of white lead in plumbing work? 13. What is the action of rain or "soft" water upon lead?

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**Report of the Council of the Association of Sanitary Inspectors of  
Great Britain to the Seventh International Congress  
of Hygiene and Demography.**

Communicated by

The Chairman of the Council of the Association,  
MR. HUGH ALEXANDER.

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The Council of the Association of Sanitary Inspectors of Great Britain have thought that it would interest the members of the International Congress of Hygiene to hear a short report relating to the duties of sanitary inspectors and the conditions under which those duties are discharged, and how far they are useful for public service in a sanitary point of view.

To the foreign visitors and members of the Congress, the subject may, we think, be of some special interest, because the service we represent is singularly illustrative of the methods of progress peculiar to the English people.

Our organisation is, comparatively, a new departure from a system almost as ancient as our constitution itself. Since the days of Queen Elizabeth there has always existed in every distinct centre, in every village even, an officer who might be considered a sanitary inspector, inasmuch as he possessed the power to remove any extreme nuisance that was injurious to the health of the community. This officer was the overseer of the highways; it was an elective office annually made by the local ruling authority or vestry, and it devolved

on some responsible and respectable inhabitant, as did other offices, such as overseer of the poor, and even parish constable. In emergency these offices, in combination with others constituting the vestry, had the power also to appoint, temporarily, persons of various degree and influence to inspect and otherwise assist in the abatement of a nuisance, and of the causes leading to it. The authority could send out inspectors to view and report to them; they could draft persons from the parish workhouse or other places to form a cordon around infected localities; and, under some circumstances, they could remove the infectious sick to the pest-house or infirmary. This was a loose method of meeting the great visitations of disease, but it suited the apathy of the freedom expressed in the saying, "an Englishman's house is his castle"; and this spirit of freedom so determinedly remains, that in the legislation of the present day it is practically again set forth almost in its primitive and somewhat retrograde form. By an Act of the year 1855, the first important changes in sanitary legislation in England were introduced. The Act was the result of long agitation and almost endless compromises. It ought to have been made some years before, when the new Poor Law came into existence; and many far-seeing men, including, first and foremost, our late distinguished President, Sir Edwin Chadwick, were most earnest to make sanitary legislation for grievous sanitary evils uniform with the great social legislation affecting the poor. But in our usual one-thing-at-a-time and gradational fashion, the Sanitary Act remained until the date named, 1855.

Amongst other important modifications of law, brought in by the Act of 1855, was that of medical supervision of the public health. A large and organised staff of medical officers of health was instituted. These officers were to be elected by the local authority, and were to be at the mercy of that authority in every case. It was in vain that the more advanced reformers declared that the medical staff, in order to be able to perform its great duties with full and complete effect, must be left with proper independence of action. They were shorn of all power, except that of report to their authority.

#### *Origin of the present System of Inspection.*

The office of sanitary inspector, so-called in the first instance, came into existence practically as the adjunct, so to speak, of the medical officer. The selection of the sanitary inspector was made by the vestry or local authority. In early days it sometimes happened that the medical officer of health "found" the inspector for the vestry, and his own recommendation or influence secured the election. In time, as the office increased in importance and as the duties were discovered to clash sometimes with local and personal interests, the election became more stringent, and now there may be as sharp a contest for the post of inspector as for any other post that falls under the vote of the elective authority.

#### *The first Selections of Inspectors.*

From the circumstances under which the new body of inspectors originated on the Act of 1855, it followed naturally that there was at

first no union or bond between them. They were selected from various classes of the working community without any special idea of fitness for the office, save and except respectability, good character, and in some cases—especially in populous parts of great cities—a knowledge of the district in which it was their mission to labour. The office itself was not enticing to men who felt they could do better. It was always underpaid; it was always held at the pleasure of the authority, with risk of immediate dismissal; it was unthankful, since there were over it really three masters, the local board, the medical officer of health, and the public that had to be served; and, as may be expected, it was not at its best a pleasant office, since it caused those who followed it to have to enter and inspect the worst dens of disease of the infectious kind, to report on their condition, to superintend the removal of nuisances, and to disinfect infected rooms and clothing.

The men selected for office were, consequently, a peculiar people; men who had nothing better to do, and men, like policemen and soldiers, who had filled their terms in the services, and had learned to become accustomed to duties in which there was some personal risk. We do not feel in any sense ashamed of such a beginning; on the contrary, we are proud that a good, courageous, and honest body of men of this sort was found for it. We only name the fact to indicate the history of our organisation and the changes which have taken place, leading, as we venture to think, to other changes which ought to be made in our status and position.

For many years we remained in the condition described, fulfilling an irksome and almost impossible responsibility without a spark of independence; performing important labours, at the best with slowness and anxiety; and facing, daily and hourly, contending interests. The result has been that we have constantly been blamed for interference, and accused of apathy or idleness. For example, in the report of the Royal Commission on the Housing of the Working Classes, it was said that much evidence was given from various parts of London which proved both the absence of adequate inspection and of sufficient activity on the part of the inspectors. The “perfunctory” work of the inspectors was commented on, and it was argued that, according to the custom of certain portions of the Metropolis, it really did not matter whether the staff of inspectors were large or small. The same Commission insisted that trained men should alone be employed for inspectorship, and that the authorities should in all cases “select persons acquainted with the principles of sanitation and of building construction.”

The opinion thus expressed by the Commission is that which we ourselves had arrived at long before. Our work, in fact, became by a process of evolution less of a menial service, and more of a true and life-saving science—a very simple science in itself, no doubt, and very common-place, but still useful, and something more than a mere servitude to those who carried it out.

To be very plain, as we worked we began to learn. We picked up information from all quarters; from the medical officers of health we



gathered large sums of information in the details of scientific sanitation; their directions became our lessons, and they our learned professors. Out in our daily work we got an insight, which no other officers ever before got, of the habits of the people and of the conditions of their homes and sanitary wants. We saw the defects under which the people laboured and still labour; we ascertained what, to use a common but descriptive expression, they would and would not "stand" in the way of sanitary reform; and we gauged so precisely what could and what could not be done by law to remove dangers to health, that now and then a lawyer himself does not think it beneath him to take a hint from us as to what he can successfully condemn or defend in matters relating to nuisances and their abatement.

Under such progressive influences as these, we began, about nine years ago, to organise amongst ourselves; and in time we formed the Association of Sanitary Inspectors of Great Britain, which now numbers several hundreds out of the 2,000 of our class in this kingdom.

We were fortunate at once in securing the late Sir Edwin Chadwick as our President. He was a man removed from all party influences, and under the encouragement he gave us, and under the influence of his simple and at the same time comprehensive ideas of true sanitation, we advanced rapidly towards better organisation and system, so that we are passing at this moment from an irregular and accidental multitude into something like a professional body, with fixed views and common aspirations for a more useful, intelligent, and independent future. We have found in these aspirations one most hopeful sign. We are becoming remarkably in touch with the public, far more so than we originally anticipated. Our general meetings are well attended, well supported, and favourably noticed by the great organs of public opinion; and there is a living sympathy with us in all classes of society, from the highest to the humblest, arising, as we think, from the facts that the public opinion on sanitation is improving, and that we are recognised as the active instruments by which the sanitary measures that have to be adopted are worked out. We come into contact daily with people in their homes and speak with them on matters of practical sanitation more than any other persons in the army of sanitary reformers. We also often meet together amongst ourselves to discuss, in our own way, the most practicable and useful methods for carrying out our work; we read and discuss papers; and, whenever we can, we obtain lectures and papers from gentlemen who belong to other departments of sanitation, and who have greater scientific knowledge than we claim to possess.

In the preceding passages we have noticed the origin and intention of our Association. We now proceed to describe the wishes and hopes we entertain for the future of those who are to be participators in our work. It will be gathered already that we are no longer the accidental and untrained collection that we once were; but that we are so far advanced in years as to have commenced to entertain and form ideas of our own. These ideas we would desire respectfully to place under three heads.

*(a.) Education of the Sanitary Inspector.*

We think the time has come when no person should be competent for election to the position of sanitary inspector until he has shown a fair elementary educational standard. He should, we think, not only be thoroughly master of what in England is called the three R's (reading, writing, and arithmetic), but he should have an elementary knowledge of chemistry, so as to understand the action as well as the practical application of the different gases and liquids which are used for disinfection and purification; of physical science, sufficient to give him an intelligent appreciation of all mechanical methods of sanitation; of architectural construction, enough to show to him what is necessary for health in the dwelling-house and in public buildings; and, lastly, of those general rules of sanitary science and sanitary legislation as shall fit him to perform all that he has to undertake with that soundness of judgment and knowledge which alone gives confidence to the inspector himself, and to those for whom he is engaged. These would be advantages which the past race of inspectors has much felt the need of; and the remembrance of their need makes us more anxious to render the path of work and duty easier and better for those who are to follow in the same walk of life.

Our council thinks that a school or college devoted to education in the departments specified is urgently demanded, and we are considering at this moment how the project can be brought most readily and effectively into action.

*(b.) Qualification of Sanitary Inspectors.*

In addition to systematic education, we feel that a system of examination for competency for the discharge of the duties of Inspector is now demanded, and that before any candidate for office is permitted to compete for a post, he ought to produce a qualifying certificate or diploma. The council would prefer that the Government, through one of its departments, say the Local Government Board, should appoint an examining board for this duty, and for granting a diploma to successful competitors. They also think that after obtaining the ordinary qualification, the inspector should find his primary qualification a stepping-stone for advancement to a more stringent competition, leading to qualification for higher duties, such as that of sanitary surveyor, who might take the general supervision of inspectorship over large districts, and give uniformity to sanitary inspection over all the kingdom.

*(c.) Tenure of Office, and Protection in Performance of Duties.*

As will be observed already, the sanitary inspector has no protection in the performance of his official duties. He has no tenure of office beyond what the local authority pleases to give him; and he may be discharged at any time for doing an act of the most important usefulness. This takes from him independence and heart for his work, and often subjects him to the most serious misapprehensions. The public has no conception of his position in this respect. On this subject our present President, Dr. Benjamin Ward Richardson, wrote a short letter in reply



to a question addressed to him by a public man who wished to be informed on the claims of the inspectors for the protection we seek. The President said—

“No class of public officers require protection in the performance of their duties more than the sanitary inspectors. The suggestion of a sanitary defect or of a sanitary improvement, even by sanitarians so independent as myself, is constantly a cause of annoyance and serious misunderstanding. How much more, therefore, must the inspector—who is the active instrument for doing what others, who rarely appear and who in their collective capacity do not individually exist, direct to be done—have to contend with. I have heard one of them abused as if he were committing a great wrong or performing a piece of wanton mischief, at a time when the duty he was carrying out was of vital importance to health and life. Moreover, the urgency of the services of the inspector is made no excuse for their most timely activity. In the work of sanitation, promptness of action is often the direct principle of success. I remember in my early professional life being called to visit a youth who had been brought into a provincial town suffering from some obscure disease. I discovered that it was small-pox, and after attending to the man, my next care was to secure his isolation, because if that could have been done an epidemic could have been stopped at once. It could not be done, and the result was that, in a few weeks, an outbreak of small-pox was rampant, and many persons died from it. The sanitary inspector even of to-day has constantly to stand and watch in crises equally serious. As one of the police of sanitation, he is first on the scene of danger; but he dare not, on his own instance, interfere, although he may know perfectly well what, at the moment, is the very best thing to do. Imagine a policeman similarly crippled in the performance of his duties. Imagine a policeman seeing a burglar entering a house by the window, obliged to let the robber do his work that he may first report to his office that the burglary is in progress, and get instructions as to what course he ought to pursue in order to stop the robbery and suppress the thief. Or imagine a fireman called to a fire having to go to his office to report the fact and wait for orders before he dare turn on the water. It is preposterous. The sanitary inspector, on discovering a dangerous nuisance ought to be able to remove it instantly on his own responsibility. The common law will punish him fast enough if he should go wrong.”

We ask for fixed tenure of office, and that we shall only be dismissible for misconduct or proved incompetency, with right to appeal to the Local Government Board; and we fail to see how that act of justice can be long denied to us. We also claim as a part of our duty that we shall periodically inspect, and have the power to deal promptly with all serious dangers to the public health on our own responsibility, subject to the confirmation of the local authority.

We think there is something in a name, and we know that for an office, as for a man, it is always injurious to be recognised by more names than one. We are sometimes designated by the title of sanitary



inspectors, which was indeed the title first assigned to us, in 1855. Since then we have been designated inspectors of nuisances. We prefer the original title as being more expressive of our duties and less objectionable to our official reputation.

We might add one more clause. We might urge with fairness that for our exclusive work salaries at a minimum of 25*l.* and a maximum of 300*l.* a year might be revised in our favour. But this is a topic it would be unbecoming to dwell upon in this place, and we conclude by saying how deeply we are obliged to this important Congress for affording us the opportunity of describing and defining the part we play in the history of English sanitation.

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#### DISCUSSION.

**Mr. Mark H. Judge, A.R.I.B.A.** (Paddington Vestry), heard with satisfaction of the continued progress of the movement under the enlightened initiative of the Plumbers' Company. There was, however, one remark in the paper read to which he was bound to take exception, viz., that in which it was asserted that the testing of plumbers' work was practically impossible after it was done. No one appreciated good plumbing more than the sanitary expert, and of all unskilled artizans in connection with sanitary work, none were so fruitful of mischief as the unskilled plumber; but supervision was necessary even with the most skilled registered plumber, and it was altogether a mistake for anyone to suppose that there was any difficulty in testing the work, and, indeed, he held it to be an axiom that, however skilled the workman, no sanitary work should be passed without being tested.

**Dr. Hill** (Birmingham) spoke of the necessity of improvement in the direction indicated by the action of the Plumbers' Company.

**Mr. T. Anderton**, as an operative plumber, agreed with the action taken by the Plumbers' Company. He thought that sanitary inspectors might, with advantage, be chosen from plumbers, as the latter were more practical than many of the former. The work of registering plumbers was rapidly extending throughout Great Britain and Ireland.

**Professor Hay, M.D.** (Aberdeen University), said that, as far as was known, plumbers were everywhere desirous of registration. The voluntary registration movement inaugurated by the Plumbers' Company had been very successful in Aberdeen, where most of the plumbers (masters and operatives) were registered. The classes held there for training young plumbers were well attended.

**Professor Corbey, M.D.** (Cork), spoke warmly in approval of the action of the Plumbers' Company, and gave instances from his own practice of serious injury to health arising from defective plumbing in houses. In some cases, the life of a patient depended more on the plumber than on the medical attendant.

**Principal Garnett** (Durham University), referring to Mr. Judge's remark, that there was no practical difficulty in inspecting plumbers' work, thought that the statement in the paper was intended to refer to the practical impossibility of inspecting "*repairing*" work carried out by a

journeyman who acted as his own foreman; with this statement he agreed. As the cost of training plumbers could not be supported through the Science and Art Department, a considerable portion of the funds available to local authorities or others for technical instruction should be devoted to the education of plumbers.

The following *Resolutions* were put to the meeting :—

On the proposal of the Chairman—

“That this meeting approves of the action of the Worshipful Company of Plumbers for improving the education and position of plumbers.”

This was *carried* unanimously.

Proposed by Dr. George Reid, seconded by Mr. H. Alexander :—

“1. That the present conditions relative to the appointment of inspectors of nuisances are not calculated to secure the efficient administration of the Public Health and other Sanitary Acts, and that reform is urgently needed in the direction of increased salaries and allowances for travelling expenses in scattered districts; greater security of tenure of office; definition of size of districts as regards area and population that may be entrusted to one officer; the production of evidence of fitness in the shape of some diploma by all candidates for such appointments; and the limitation of the duties (except perhaps in the case of very small districts) to those purely pertaining to the office.

“2. That it is desirable to confine the appointments of inspectors of dairies, cow sheds, and milk shops and canal boats to inspector of nuisances.

“3. That a copy of the above resolutions be forwarded to the Local Government Board.”

This was *carried*, with one dissentient.



## De l'Organisation sanitaire en Espagne.

PAR

M. LE Professeur VILANOVA Y PIERA, M.D., Madrid.



C'est pour moi un vrai bonheur que d'avoir à remplir aujourd'hui devant vous le devoir qui m'impose la délégation officielle pour cette respectable assemblée dont mon gouvernement a bien voulu m'honorer. Je désire exposer à votre considération l'état présent et le prochain avenir du service sanitaire chez moi, précédé d'un résumé historique de tous les services rendus à la science par les médecins et naturalistes espagnols que j'estime de grande portée.

Deux puissantes raisons m'obligent à procéder de la sorte, d'abord mon poste officiel, et après le pur et vif sentiment de la patrie qui m'émérit de la triste et douloureuse manière à la vue des injustes jugements

qu'en général porte l'Europe sur notre compte : Est-ce ignorance de notre développement scientifique ? Sont ces préjugés acceptés sans contrôle ? Tout cela ne saurait faire honneur à qui y croit encore, ni à qui le répète avec ou sans arrière-pensée. C'était compréhensible aux temps déjà lointains, où les peuples ne se connaissaient pas, privés de moyens rapides et faciles de voyager ; mais aujourd'hui, quand tout marche à l'union universelle, grâce aux merveilleuses conquêtes de la civilisation moderne, cette ignorance, ces préjugés peuvent-ils se concevoir ? Et cependant ils existent encore, car on méconnaît ce que nous autres Espagnols avons fait et continuons à faire ; et c'est pour cela que je viens réclamer devant vous la part de gloire qui de droit nous revient dans un service comme celui qui se rapporte à la santé publique, dans lequel il ne me sera pas difficile de démontrer que l'Espagne a devancé la plupart des autres nations. La méconnaissance de notre histoire scientifique se voit parfaitement dans les ouvrages sur l'histoire des sciences de Cuvier et de Blainville, lesquels à peine se permettent de nommer Arnaud de Vilanova, mon antécédent, et Raymond Lullio, parmi les anciens, et des temps modernes ils n'en citent que très peu. En chose bien extraordinaire, les livres des deux savants français ont été publiés près d'un demi-siècle après la complète réfutation que l'insigne Abbé Cavanilles publia à Paris même et en français, de l'article de l'Encyclopédie dans lequel Masson osa dire que l'Espagne en fait de science n'avait rien apporté dans les dix siècles derniers. Le savant botaniste espagnol, bien connu par les nombreux travaux qu'il fit dans la belle science des plantes, démontra l'inanité de l'attaque et l'absolue ignorance sur laquelle se basait la calomnie de Masson, en lui présentant l'histoire succincte de tout ce que médecins, naturalistes, astronomes, mathématiciens espagnols ont fait et publié. Comment croire que Cuvier et Blainville avec leur immense érudition ignorassent l'existence de l'ouvrage de Cavanilles, le célèbre réformateur de la classification de Linné ? Désirant, donc, pour ma part de ne pas voir se perpétuer ces préjugés et cette ignorance, j'ose soumettre à votre considération le résumé historique suivant comme introduction à l'état actuel de l'organisation sanitaire en Espagne, car il y a aussi cette même ignorance et ces préjugés dans cette branche de l'administration espagnole.

Sans oublier ce que les Arabes espagnols et respirant l'atmosphère de l'Espagne ont si largement apporté au champ médical et des autres sciences naturelles, il suffirait de signaler la figure du profond humaniste et grand philosophe Jean Louis Vives, pour évaluer ce que les sciences d'observation doivent à mon pays, car il enseigna dans l'Université d'Oxford avant l'insigne Chancelier Bacon de Verulamio, et publia ensuite la véritable méthode que l'étude de ces sciences exige, et à laquelle elles doivent les extraordinaires progrès réalisés depuis lors. Ainsi le déclare l'érudit Mayans dans la biographie de l'auteur des ouvrages qu'il édita : *fodit Vives fundamenta firmissima ad veram philosophiam ædificandam, quam postea struxit Franciscus Baconus*. Sur le même écrivait Erasme à Moro : *de Ludovico Vivis ingenio gaudeo meum calculum cum tuo consentire, is est de numero eorum qui nomen Erasmi sint obscurati*. Ce fut une tête vraiment



privilégiée que celle de cet homme insigne, car elle lui permit d'embrasser avec une singulière perspicacité presque toutes les branches du savoir ; il devient à la fois le restaurateur des belles-lettres, et le premier réformateur de la philosophie positive, car non content de signaler les causes de la décadence des sciences dans son temps, il indiqua bien clairement la manière de les corriger dans la suivante maxime, *ad incognita enim itur per cognita, et ad mentis judicium per sensuum functiones*. On doit aussi à mon compatriote la véritable méthode pour l'étude de la médecine, insistant beaucoup sur la nécessité de la baser sur la connaissance des sciences naturelles et de l'anatomie.

Il survint à Vives la même chose qu'à Michel Servet, véritable 1<sup>er</sup> indicateur non seulement de la circulation pulmonaire, mais aussi de la circulation générale, comme cela découle de ce qu'il dit dans son ouvrage de *Fidei restitutio*, et cependant la gloire de cette découverte en est induement attribuée à Harvey et à Césalpin.

Mais ce ne furent pas ces deux hommes si célèbres, ceux qui dans les temps anciens et modernes ont contribué en Espagne au mouvement intellectuel de l'Europe, ainsi que l'ont démontré en 1795 le savant Cavanilles, et en 1853 l'actuel Recteur de l'Université de Madrid, Mr. Colmeiro, mon compagnon de l'Académie de Médecine, dans le mémoire intitulé La Botanique et les Botanistes de la Péninsule hispano-lusitanienne, couronnée par la Bibliothèque nationale. Des deux livres que je viens de citer j'en extrais les curieux passages suivants. J'aurai aussi recours à d'autres publications ; daignez, chers confrères, me prêter votre attention bienveillante.

Le nommé Arnaud de Vilanova s'occupa à une époque si reculée d'hygiène sous le nom de régime de santé, citant à ce propos diverses plantes et plusieurs substances médicinales.

Gonzalo Fernandez d'Oviedo écrivit et publia en 1535 à Séville la 1<sup>ère</sup> histoire générale et naturelle des Indes.

Le célèbre Laguna, Professeur à l'Université d'Alcala et Médecin de l'Empereur Charles V, établit le jardin botanique d'Aranjuez, antérieur à ceux de Montpellier et de Paris.

Nicolas Monardes, Médecin de Séville, créa un des premiers musées d'histoire naturelle avec les objets rapportés du Nouveau Monde, sur lesquels il écrivit un livre aussi curieux qu'intéressant.

Le Sieur Franco, Professeur à l'Université d'Alcala et plus tard dans celle de Coïmbre, est l'auteur d'un des 1<sup>ers</sup> livres sur les maladies contagieuses.

François Hernandez, Médecin de Philippe II, qui l'envoya à la Nouvelle Espagne où il resta depuis 1571 à 1577, et écrivit 15 volumes sur la géographie, les antiquités et les objets d'histoire naturelle.

François Valles, surnommé le divin Valles, fut médecin de Philippe II et auteur de nombreuses ouvrages de médecine.

Dans le 17<sup>me</sup> siècle sont dignes d'être connus Jean Castañeida, correspondant en Espagne du fameux Clusio.

Le Dr. Gimenez Gil fut auteur d'un ouvrage d'hygiène intitulé Salubrité du Moncayo (montagne de l'Aragon), avec des notices sur ses plantes.

A la Bibliothèque nationale de Madrid se conservent encore les 7 volumes in-folio avec dessins coloriés, sur l'histoire naturelle des plantes, dus au Médecin Bernard Cienfuegos.

Le Médecin de Valence, Sorolla, publia un traité de botanique médicale, et forma dans cette université un herbier et y laissa beaucoup de manuscrits sur les plantes du pays.

Le 17<sup>e</sup> siècle termine et le 18<sup>e</sup> commence avec ce qui devrait bien s'appeler la dynastie des fameux botanistes du nom Salvador, dont le 1<sup>er</sup> fut Jean, pharmacien de Barcelone, auquel succéda Jacques, surnommé par Tournefort le Phénix d'Espagne; le 3<sup>ième</sup> fut un autre Jean, compagnon d'Antoine et Bernard de Jussieu dans les herborisations que par ordre du gouvernement français ils firent à travers la péninsule; Joseph et un autre Jacques complètent la liste de la célèbre famille.

Elève du 1<sup>er</sup> Salvador, le Pharmacien Minuart de Barcelone publia divers opuscules sur la belle science des plantes.

Le Jésuite Gumilla est l'auteur de l'Orénoque illustré, dans lequel il donna de curieux détails sur les productions naturelles du territoire de ce grand fleuve.

Les célèbres marins Ulloa de Séville, et Jorge Juan d'Alicante, en dehors de la part qu'ils prirent aux opérations géodésiques et astronomiques confiées aux académiciens français envoyés à Quito en 1735, fixèrent leur attention sur les produits naturels du pays, et publièrent le résultat du voyage dans les Notices américaines qui parurent à Madrid en 1772, et dans le Récit historique.

Un autre Jésuite, le Père Guevara, visita le Paraguay dont il écrivit l'histoire, ainsi que celle du Plata et du Tucuman.

Le Pharmacien du roi Ferdinand VI, Ortega, fut un des restaurateurs de la botanique chez moi; secrétaire perpétuel de l'Académie de Médecine, il fut chargé de rédiger les éphémérides qui se publièrent depuis 1738 jusqu'à 1746. Dans sa qualité de correspondant du grand Linné, il lui communiqua des notes et des dessins qui servirent pour la rédaction de l'*Iter hispanicum* publié en 1758.

Casimir Garcia Ortega, Médecin et Professeur de Botanique à Madrid, publia plusieurs ouvrages et la *Pharmacopœia hispana*, dans la plus importante partie. C'est à lui qu'on doit surtout l'établissement des jardins botaniques et des chaires dans les principales villes de l'Espagne, et l'organisation des expéditions destinées à explorer le Nouveau Monde.

Un autre Vilanova, Thomas, médecin de Valence, Professeur de Botanique et de Chimie, écrivit la *Flora valentina*, forma un magnifique et riche herbier avec les plantes recueillies dans les nombreux voyages qu'il fit en France, en Italie, en Allemagne et dans la Hongrie, et publia un livre sur matière médicale.

Ignace Asso, diplomate et jurisconsulte éminent, sut organiser un musée d'histoire naturelle à Saragosse, sa patrie, et publia de nombreux ouvrages sur la botanique, la zoologie et l'agriculture.

Joseph Celestin Mutis, grand botaniste, habile médecin et mathématicien distingué, fut le chef et le principal membre de l'expédition à

la Nouvelle Grénade, où il étudia la végétation, les mines dont il en exploita quelques-unes; il s'occupa surtout de la flore de cette région, dont les précieux matériaux se conservent dans le jardin de Madrid. Il publia d'intéressantes études sur le Quinquina dans un journal de S<sup>te</sup> Fé de Bogota, où il fit construire un observatoire astronomique qu'il sut diriger.

Antoine Palau, médecin catalan, auteur de grand nombre d'ouvrages, parmi lesquels il faut indiquer un Cours élémentaire de Botanique.

L'Abbé Cavanilles, un des botanistes les plus renommés de son temps, réforma la classification sexuelle de Linné; fut l'auteur de l'*Icones et Descriptiones Plantarum*, 6 volumes in-folio, dont les nombreuses planches furent dessinées par lui-même; et de la description du royaume de Valence sur le rapport géographique, géologique et des produits naturels et agricoles.

Antoine Marti, médecin catalan, fut le premier qui analysa l'air atmosphérique, ce qui lui valut des applaudissements des principaux chimistes de l'Europe. Il se distingua aussi par ses études et ses expériences sur les sexes et la fécondation des plantes.

Hypolithe Ruiz et Joseph Pavon, célèbres expéditionnaires et auteurs de la grandiose Flore du Pérou et du Chili. Ruiz publia en 1792 à Madrid la Quinologie, ouvrage qui fut bientôt traduit en plusieurs langues, et la description, avec des dessins des milliers d'espèces végétales par lui découvertes. L'Académie de Médecine de Madrid publia plusieurs mémoires de Ruiz sur des plantes médicinales.

François Balmis, médecin de Valence, apporta de l'Amérique en 1792 plusieurs racines d'Agave et de Begonie qu'il acclimata dans sa belle patrie, et publia en 1794 un livre très curieux sur les propriétés médicales de ces plantes. Mais à part des grandes explorations qu'il fit dans le Nouveau Monde, mon compatriote réalisa la plus extraordinaire expédition qu'on puisse imaginer, car il s'embarqua le 30 novembre 1803 dans le port de la Corogne dans un vaisseau de guerre, avec 22 nourrices et un nombre égal d'enfants, ayant fait pendant trois ans jusqu'à 50,000 vaccinations dans les îles Canaries, à Cuba et Porto-Rico, Caracas, Guatémale, Philippines et les possessions hollandaises et anglaises dans l'extrême Orient. A son retour Balmis fit publier une disposition royale pour la conservation du vaccin, et en 1814 publia un très remarquable règlement sur la matière.

Martin Sessé et Joseph Mociño effectuèrent depuis 1795 jusqu'à 1804, avec un brillant résultat, la grandiose expédition à la Nouvelle Espagne.

Félix d'Azara inaugure le 19<sup>ième</sup> siècle en publiant d'intéressants ouvrages sur les mammifères et les oiseaux du Paraguay et du Plata qu'il rapporta de ses voyages.

Étienne et Claude Boutelou se distinguèrent principalement par leurs études sur la botanique et l'agriculture.

Lagasca, Professeur dans le Jardin de Madrid, médecin et botaniste distingué, écrivit un Cours de Botanique, et publia à Londres, pendant son exil, l'*Hortus siccus Lundinensis*; ce fut chez lui une constante préoccupation que de faire paraître sa Ceres, pour laquelle il avait



récueilli de nombreux matériaux avec l'efficace coopération de Simon de Rojas Clemente, orientaliste et savant de 1<sup>er</sup> ordre, élève du célèbre Abadia, qu'il devait accompagner dans son fameux voyage en Afrique. Clemente est l'auteur de plusieurs ouvrages, parmi lesquels il faut signaler l'Essai sur les variétés de la vigne en Espagne. Le Gouvernement de mon pays vient de faire publier une nouvelle édition de ce fameux livre, dans un in-folio avec de magnifiques planches.

Je ne veux pas abuser de votre bénévolence, car je crois que ce que je viens de dire suffit pour démontrer quelle part si importante ont prise dès les temps les plus reculés mes compatriotes au mouvement scientifique, tout en rendant des services signalés et spéciaux à la médecine. Quelle plus grande gloire pour l'Espagne que celle de l'introduction en Europe de la plupart des plantes médicinales et surtout du Quinquina par les nobles Comtes de Climatron et par leur médecin, Jean de Vega, en 1640? Peut-on décrire avec de plus vives couleurs une souffrance mentale que l'a fait notre immortel Miguel de Cervantes dans son Quichotte?

Le fameux Cid Rodrigo de Vivar institua en 1067 le 1<sup>er</sup> lazaret, pour le traitement de la lèpre; le 1<sup>er</sup> hôpital de campagne fut établi à Grenade par les rois catholiques; et au Père Xofré on doit la création à Valence en 1409 d'un des premiers asiles d'aliénés. Dans le très ancien Code du Fuero-Juzgo, dans les lois appelées las Partidas, et dans les Institutions de l'Empereur Charles V on voit déjà les premières délinéations de ce qui avec le temps devait devenir la médecine légale et les règles pour l'exercice de la médecine.

Pourquoi donc, l'Espagne qui, d'après ce qui précède, a devancé bien d'autres nations dans des nombreuses branches du savoir, est-elle ignorée et maltraitée, même calomniée injustement? Plusieurs causes ont produit ce fâcheux résultat, n'étant pas assurément la moindre, la punible indifférence avec laquelle on regarde chez moi tout ce qui peut intéresser notre propre gloire; en général nous préférons réaliser les prouesses que vanter leur importance. La situation topographique y entre aussi pour beaucoup; mais la cause principale c'est, sans le moindre doute, les voyages qui ont fait surtout certains écrivains français qui n'ont fréquenté que les classes plus basses de la société, et qui voulant ensuite donner à leur récit un caractère original peignent les Espagnols avec les couleurs que leur fournit leur fantaisie. Il y en a qui portent le ridicule jusqu'à chausser ce qu'ils croient être leur propre cothurne, c'est-à-dire, chapeau bas dit *calañés*, pantalon à cloche soutenu par la *faja* ou ceinture à plusieurs tours et le couteau ou *navaja*. Tout cela, chers confrères, n'est pas moins ridicule que faux, et nous fait sourire, à nous les vrais Espagnols, qui sommes vêtus, comme vous voyez, comme les autres peuples de l'Europe, et qui nous intéressons autant que les plus enthousiastes pour le progrès scientifique. La passion politique et les puérides rivalités nationales ont contribué aussi à ce fâcheux résultat.

Or la même ignorance et les mêmes injustices existant encore lorsqu'il s'agit des affaires sanitaires espagnoles, je suis moralement forcé à exposer à votre savante considération, le présent et le prochain

avenir de l'organisation de cette branche administrative dans mon pays.

Le service sanitaire en Espagne est basé sur la division territoriale, laquelle est représentée par trois cercles concentriques, savoir, l'Etat, la province et le municipe, qui représentent l'unité dans l'entité juridique. Les provinces d'outremer se régissent par des dispositions spéciales : celles de la péninsule sont en nombre de 49, et les municipes 10,000 à peu près.

Les trois cercles sanitaires ont un élément consultif, un autre exécutif et un troisième qui s'appelle d'inspection. L'élément consultif est représenté par un corps délibérant qui répond à toutes les questions proposées par le pouvoir exécutif, auquel il peut aussi, par sa propre initiative, lui soumettre tout ce qui lui semble convenable à la santé publique.

L'élément exécutif suprême, responsable de l'application des lois, est représenté par le Ministre de l'Intérieur que nous appelons de Gobernación, secondé dans ses fonctions par un chef de bureau, c'est-à-dire, par le Directeur-Général de Santé et de Bénéficence, avec des employés subalternes chargés des diverses services terrestres, maritimes, de statistique sanitaire, etc.

Ainsi, donc, le pouvoir exécutif représente l'action, dont les ordres se communiquent aux Gouverneurs ou Préfets des provinces, et ceux-ci les transmettent aux Maires pour leur exécution. L'élément consultif illustre et conseille à la Direction de Santé et au chef suprême administratif, le Ministre ; et l'inspection examine avec le plus grand soin et avec responsabilité tout ce qui se rapporte aux grands intérêts de la santé publique.

Pour le Ministre et le Directeur de Santé l'élément consultif est représenté par le Conseil royale de Santé et par l'Académie de Médecine. Les Gouverneurs et les Maires ou Alcaldes ont aussi cet élément qu'on les appelle Junta ou bien Comité de Santé, provinciale et municipale.

L'inspection est représentée par des individus du Conseil de Santé, par des médecins de véritable compétence nommés par le Ministre, lorsqu'il s'agit de remplir certaines fonctions de caractère ou d'ordre générale. Les Gouverneurs et les Alcades peuvent aussi nommer des inspecteurs provinciaux ou municipaux, sans qu'il existe pour ce service du personnel permanent.

On voit, donc, d'après ce qui précède, que toute résolution de l'élément exécutif, Ministre, Gouverneur ou Alcalde, porte toujours la garantie de l'élément consultif et d'inspection. Les Gouverneurs ont aussi des espèces de conseillers dans les Délégués de Médecine et Chirurgie, de Pharmacie et Vétérinaires, et dans les Douanes il y a des Inspecteurs spéciaux des denrées médicinales ; et les Maires peuvent consulter avec les médecins et pharmaciens titulaires, qui prêtent gratuitement leurs services aux pauvres des villages.

Servent de complément à notre organisation sanitaire, l'Institut central de Vaccination, et le corps de médecins des bains et des eaux

minérales, et celui de la santé maritime, lesquels se régissent par des règlements spéciaux.

La loi actuelle, dont je viens d'en extraire, pour ainsi dire, l'essence, date de 1855; mais elle fut précédée d'une foule de dispositions sanitaires qui furent prises déjà dans des temps très reculés. Ainsi, par exemple, en 1546 on voit que dans les îles Baléares les autorités de Majorque venaient obligées, par une espèce de comité de santé, de faire connaître tout ce qui se rapporte à la santé publique; les voyageurs et les marchandises ne pouvaient pas débarquer avant d'avoir exhibé la patente du lieu de provenance et le certificat de santé à bord.

A l'occasion de la peste de Séville en 1568, des cordons sanitaires furent établis; les médecins venaient obligés de présenter note des malades et de ceux qui succombaient, dans le but de former la statistique sanitaire, qui commença alors à se réaliser.

A Barcelone les mesures qui furent prises étaient très sévères, car le Commissaire de Santé pouvait condamner, même à la peine de mort, les contrevenants des ordonnances.

On peut bien dire que le service sanitaire commença à s'organiser en 1720, lors de la terrible peste de Marseille. Ce fut alors qu'on institua la Junta suprême de Santé, composée de plusieurs conseillers de Castille. En 1740 s'ordonna la formation des listes de médecins et de chirurgiens; et fut confirmé le Protomédicate qui avait été créé par les souverains Ferdinand et Elisabeth.

En 1780 Charles III disposa la création de l'École de Médecine de Madrid, laquelle porte encore le nom du fondateur.

En 1757 la Junta suprême de la Principauté de Catalogne ordonna la publication d'un projet de Règlement général de Santé qui a été la base de l'organisation actuelle. En 1766 la Junta de Cadix motiva la publication des ordonnances de santé terrestre et maritime, qui furent rédigées le 20 novembre 1804 par Benoît Puente. La fièvre jaune qui fit tant de victimes en 1807 et en 1821 à Cadix, Malaga, Tortose, Barcelone et dans d'autres endroits, fut, pour ainsi dire, la cause du Règlement général publié par la Junta suprême du Royaume; en 1813 apparut la première loi organique de santé.

En 1814 commence à s'organiser le service des eaux minérales, et le corps de médecins chargés des établissements, lequel fut définitivement créé par décret royal en 1816, plus ou moins modifié en 1834, et par des dispositions postérieures.

Enfin, la réforme sanitaire de 1847, antérieure à celle de France et d'Italie, fut la dernière évolution sanitaire qui précéda la loi actuelle. On voit, donc, que l'Espagne, loin d'être en retard, a devancé dans cette branche de l'administration publique bien d'autres nations, que c'est ce que je voulais prouver.

La loi actuelle est assez bonne; mais étant susceptible de perfectionnement, on a pensé à l'améliorer par le projet déjà approuvé par le Sénat et soumis aujourd'hui à la délibération du Congrès des Députés, et duquel on peut se former une idée en consultant le tableau ci-joint.



## NOUVELLE LOI SANITAIRE D'ESPAGNE.

Titre 1 <sup>er</sup>	{ Chapitre uni- que . . .	{ Fin et extension de la loi. Division . . .	{ Par sa propre nature { Santé terrestre. Santé maritime. Par son orga- nisme { Administration centrale. " provin- ciale. " munici- pale.
Titre 2 <sup>e</sup> . Santé terrestre	{ Chapitre 1 <sup>er</sup> . Hygiène publique.	{ 1 <sup>o</sup> Aliments et boissons, marchés, établissements bro- matologiques. 2 <sup>o</sup> Habitations, établissements publics, maisons pour dormir, constructions civiles. 3 <sup>o</sup> Rues, places, voies publiques, chemins de fer. 4 <sup>o</sup> Hygiène rurale, des forêts, Hygiène minière. 5 <sup>o</sup> Industries insalubres, industries dangereuses, d'autres industries. 6 <sup>o</sup> Conduction des eaux potables, évacuation des ordures, etc. 7 <sup>o</sup> Cimetières, transport des cadavres, dépôt, autopsie, inhumation, crémation. 8 <sup>o</sup> Abattoirs, crémation d'animaux, fumiers, marchés des bestiaux. 9 <sup>o</sup> Dispositions générales.	
		{ Chapitre 2 <sup>e</sup> . Endémies, contagion, épidémies, épizooties. Chapitre 3 <sup>e</sup> . Sources minéro-médicinales. Chapitre 4 <sup>e</sup> . Vaccination et ré vaccination. Chapitre 5 <sup>e</sup> . De la pratique des professions médicales. Chapitre 6 <sup>e</sup> . Vente des médicaments, pharmacies, drogueries. Chapitre 7 <sup>e</sup> . Inspection des denrées médicales et autres. Chapitre 8 <sup>e</sup> . Statistique sanitaire et Démographie.	
Titre 3 <sup>e</sup> . Santé maritime	{ Chapitre 1 <sup>er</sup> . Des ports	{ Section 1 <sup>ère</sup> { Partie 1 <sup>ère</sup> . Déclaration de l'état sani- taire. " 2 <sup>e</sup> . Visite aux vaisseaux nou- veaux. " 3 <sup>e</sup> . Visite à l'entrée des vaisseaux. " 4 <sup>e</sup> . Des patentes. Section 2 <sup>e</sup> . De la libre pratique et des quarantaines. Section 3 <sup>e</sup> . Du service sanitaire dans les baies. Section 4 <sup>e</sup> . De la visite à la sortie des vaisseaux. Section 5 <sup>e</sup> . Dispositions générales.	
	{ Chapitre 2 <sup>e</sup> . Des lazarets	{ Section 1 <sup>ère</sup> . Des lazarets d'observation. Section 2 <sup>e</sup> . Des lazarets im- purs { Partie 1 <sup>ère</sup> . Conditions de ces lazarets. " 2 <sup>e</sup> . Visite à l'entrée des vais- seaux. " 3 <sup>e</sup> . Régime quarantenaire. " 4 <sup>e</sup> . Visite à la sortie des bateaux.	
		{ Chapitre 3 <sup>e</sup> . Statistique sanitaire maritime.	
Titre 4 <sup>e</sup> . Admi- nistration sa- nitaire.	{ Chapitre 1 <sup>er</sup> . Administra- tion centrale	{ Administration active - Administration consultive -	{ Section 1 <sup>ère</sup> . Direction générale de Santé et Bénéfice. " 2 <sup>e</sup> . Inspection générale de Santé publique. " 3 <sup>e</sup> . Délégations sanitaires en Orient et en Amérique. " 1 <sup>ère</sup> . Du Conseil d'Etat. " 2 <sup>e</sup> . Du Conseil supérieur de Santé. " 3 <sup>e</sup> . De l'Académie de Médecine. " 1 <sup>ère</sup> . Inspection médicale, phar- macentique et vétérinaire des districts. " 2 <sup>e</sup> . Inspection des eaux miné- rales. " 3 <sup>e</sup> . Institut de vaccination. " 4 <sup>e</sup> . Inspection des ports et des lazarets impurs. " 1 <sup>ère</sup> . Conseils provinciales de Santé. " 2 <sup>e</sup> . Académies de Médecine.
	{ Chapitre 2 <sup>e</sup> . Administra- tion provin- ciale . . .	{ Administration active - Administration consultive -	

Titre 4 <sup>e</sup> . Administration sanitaire.	Chapitre 3 <sup>e</sup> . Administration municipale.	Administration active - Administration consultative	{	„ 1 <sup>re</sup> . Inspection médicale.
			{	„ 2 <sup>e</sup> . Inspection pharmaceutique.
			{	„ 3 <sup>e</sup> . Inspection vétérinaire.
	Chapitre 4 <sup>e</sup> . Organisation du personnel.	Des escalons. De l'accès dans la carrière. De l'avancement dans la même. Des droits.	{	
Titre 5 <sup>e</sup> . Des mesures disciplinaires et des peines.				
Titre 6 <sup>e</sup> . Des droits sanitaires.				

## Dans quelle Mesure l'État peut-il intervenir pour empêcher la diffusion de la tuberculose ?

PAR

Signor ALFONSO CORRADI, Professeur à l'Université de Pavie.

I. La croyance à la contagion de la tuberculose, c'est-à-dire de la phthisie pulmonaire, est très ancienne et de bonne heure on a tâché d'en entraver la diffusion : on était arrivé, surtout dans le pays du midi de l'Europe, à la traiter presque comme une maladie infectieuse aiguë. Mais toutes ces rigueurs n'aboutirent à rien.

II. Les recherches et les découvertes modernes ont mit en évidence la contagion de la tuberculose, et en même temps ont démontré que cette contagion ne s'exerce que dans une atmosphère circonscrite, dans un rayon limité. Cela s'accorde parfaitement avec l'observation que la contagion arrive ordinairement où il y a une *cohabitation prolongée*, comme c'est le cas du mariage.

III. Mais, même dans ces conditions, la contagion ne s'effectue pas toujours ; le germe ne suffit pas ; il faut le terrain convenable, c'est-à-dire une certaine *prédisposition*, qui peut être acquise, ou bien héréditaire.

IV. La prophylaxie de la tuberculose doit donc combattre *l'agent de la contagion* et ses *moyens de propagation*, aussi bien que la *receptivité*. Mais cette prophylaxie est ce du domaine de l'hygiène privée ou de l'hygiène publique, de l'individu ou de l'état ?

V. La mesure capitale (atteindre l'agent de la transmission) est hors de la portée de l'état ; dont l'intervention ne peut être que indirecte, quand même il défendrait la vente de la viande et du lait des animaux tuberculeux, mode de transmission d'ailleurs, qui n'est pas définitivement démontré, et qui paraît ne s'effectuer que dans des circonstances très particulières. Il ne reste à l'état que de s'appuyer sur l'hygiène générale qui a pour but, en fortifiant surtout les héréditaires et les débilités, de diminuer la réceptivité des individus.

VI. Mais la tâche de l'hygiène publique ne doit pas s'arrêter à donner de l'air pur, une alimentation saine et suffisante, à éloigner les causes d'insalubrité non, elle, doit s'allier à *l'éducation*, à qui appartient de donner à l'obéissance passive l'élan de la participation intelligente.

C'est l'éducation qui doit persuader de la nécessité de remplir les obligations qu'impose la vie sociale, qui doit inspirer le dévouement de sacrifier sa liberté, ses penchants au bien public. Ce sera l'éducation, pas la loi impuissante, qui donnera la prévoyance dans le choix des mariages, et la force morale de s'abstenir de continuer ses propres malheurs physiques dans une vie nouvelle, puisque l'hérédité est une sorte de contagion intérieure, plus sûre et impitoyable encore dans ses effets, que la contagion extérieure.

VII. Entre l'hygiène publique proprement dite et la privée il y a l'hygiène des diverses *collectivités*, telles que casernes, collèges, ateliers etc.; les autorités compétentes sachant les dangers que les tuberculeux peuvent y apporter, éviteront l'encombrement; elles se mettront en mesure d'avoir détruits les crachats et le pus avant leur dessiccation; elles pourront même séparer les malades des sains. L'hospitalisation des tuberculeux entre dans cette catégorie de mesures qui se placent entre le commandement de la loi et l'action individuelle.

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**Friday, 14th August 1891.**

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The Chair was successively occupied by

Mr. SHIRLEY MURPHY (London),

Dr. PISTOR (Berlin),

Professor CORRADI (Pavia),

Dr. COVERNTON (Canada),

Brigade-Surgeon PRINGLE, and

Dr. F. W. BARRY (London).

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**An Illustration of the Advantage of the Isolation of Persons exposed  
to Infection afforded by a limited Outbreak of Typhus  
Fever in Leeds, during the Spring of 1890.**

BY

J. SPOTTISWOODE CAMERON, M.D., B.Sc., Medical Officer of  
Health, Leeds.

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A case of exanthematous typhus was heard of on the 24th of April 1890, and a house to house inspection was made.

On the 26th, five typhus patients from three other houses were sent into hospital.



On the 25th, four persons living in the house first heard of, and on the 26th, 10 living in the other infected houses were sent to our shelter for the sake of having their houses disinfected, and were there kept under observation. On the 27th, a sixth case was discovered a few doors from those last-mentioned, sent to hospital, and her husband sent to the shelter.

Thus, in the course of three days, 22 persons were dealt with, of whom seven were sent to hospital as cases of typhus, and 15 isolated in the sanatorium. Of these 15, three developed typhus in the sanatorium, and were transferred to hospital between the 29th of April and the 8th of May, their illness being due to infection received before we heard of the existence of the disease in the houses from which they came.

A few other cases also occurred afterwards in the borough, and the occupants of their houses were also isolated, but as they were removed to hospital earlier in the disease, no delay in notification having occurred in the latter cases; in only one other case was there a second development of fever in the family.

The total results were as follows:—From 11 houses, 12 patients were taken to hospital for typhus, and 34 persons isolated in the shelter. Four of these latter developed typhus within a fortnight of their having been so isolated. Of 16 cases thus under treatment, three proved fatal. There were two other cases dealt with, about which there was some doubt as to the exact nature.

The four patients who were taken ill during isolation were under medical observation, and were removed from contact with the other persons isolated as soon as their temperatures began to rise. Had they been at home, much valuable time would certainly have been lost, and probably these four cases would have led to a great many others. As it was, there is no reason to suppose that any new case of typhus received the infection after these dates from any of the houses dealt with on the 24th, 26th, and 27th of April. It is probable that the infection in the latter cases arose, previously to that date, from the house of a man removed on the 26th April, who had been ill from the 24th of the preceding month, but the exact nature of whose illness had not been recognised.

As immediate and complete measures of disinfection were taken on the premises on the 26th of April, no communication of infection after that date was at all likely. The month that was lost, however, before our hearing of the case made it extremely difficult to trace the exact method by which the infection had spread.

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## Compulsory Notification of Infectious Diseases.

BY

PHILIP BOOBYER, M.B., Medical Officer of Health for Nottingham.

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It is impossible with the limits of time and space at my disposal here to discuss adequately, or in all its bearings, the whole subject which such a title as this opens up before us. A brief sketch must suffice. My object will be to state a case plainly and simply for compulsory notification, to enable those who have had no practical experience of its working to form an opinion of its prospective value, and to show how frivolous and premature are the criticisms passed upon it before it has been fairly tried in conjunction with those preventive measures towards the development of which it is simply intended to stand in the relation of a means to an end.

By compulsory notification of infectious diseases we understand the legal obligation to send immediate notice respecting the occurrence of certain infectious diseases to the sanitary authority of the district in which the affected person or persons are for the time being resident, together with a few particulars of place and people for the guidance of the authority. Different persons have been made responsible for the performance of this duty under the several Acts and Provisional Orders.

In one small class the householder alone is mentioned, he or she being solely responsible to the sanitary authority. This system of so-called householder notification has been tried in some three urban districts, of which the town of Greenock is one, and has proved a complete failure in all. The cause of the failure is not far to seek. The majority of people do not care to notify unless compelled to do so. Under this system there is practically no compulsion, for in the event of prosecution for neglect to notify, the onus of proving a guilty knowledge on the part of the responsible layman rests with the authority, and such proof in the majority of cases is not very readily obtainable. A case has recently occurred in Nottingham where a man in good position sent a servant from his house in the town to her home in the country while suffering from scarlet fever contracted through attendance upon his child, but in which a prosecution has had to be abandoned, because it was found impossible to produce legal evidence of a guilty knowledge of the girl's condition on the part of the master, without using means to obtain it which public authorities in such cases are naturally loth to adopt. This prosecution was instituted under section 126 of the Public Health Act, 1875, but had it been a case of simple failure to notify the sequel would have been the same.

All those systems under which the householder and medical attendant have been made in any way separately responsible for notification to the

sanitary authority or their officer, have been classed together as belonging to the so-called "dual" system, but in theory these systems were sufficiently various. For instance, in two large towns, Edinburgh and Aberdeen, there was no obligation upon the householder to notify unless a medical man had been called in. In five towns he was exempted only if a medical man had been called in. In 37 towns he was required to notify in any case. Under Mr. Ritchie's Act the duty of notification devolves equally and invariably upon both householder and medical attendant. In practice, however, it has been found that, by the tacit consent of all parties, every variety of this as of other theoretic systems quickly resolves itself, when a medical man is in attendance, into notification by him alone. The accuracy of this statement has, I know, been recently called in question, but it is borne out by the unanimous testimony of all those who have had practical experience in the matter.

The "single" system, so highly lauded by the opponents of the "dual," has been tried in three considerable towns only, viz., in Bradford, Norwich, and Nottingham.

Under it the medical attendant is required immediately after diagnosis to fill up and hand to the householder a printed notification form, which the latter in turn is directed to transmit forthwith to the sanitary authority. So much for the theory of the system. In practice, as I have already said, the notification is left entirely to the medical attendant, who keeps his book of forms at home, and sends his certificate direct to the medical officer of health.

In Nottingham I have found that out of 1,508 consecutive notifications, 1,360, or 90 per cent., were made by the medical attendant as above stated; 9, or .59 per cent., by the householder in the manner prescribed by law, and the balance, less than 10 per cent., by myself, by officers of my department, by the police, by the clergy, or by neighbours of the affected families.

Before the passing of Mr. Ritchie's Act of 1889, which was made compulsory for all London, but optional elsewhere, compulsory notification was in force under local Acts or Provisional Orders duly confirmed in 56 urban districts of England and Scotland. Although local powers for its practice were obtained in some cases as early as 1876 it did not come practically into operation except in a few cases before 1882. Of the 28 greater English towns, including the metropolis, 17 had adopted it prior to 1889, and 11 had not, London being among the last.

In only a comparatively small number of the towns was a complete schedule of notifiable diseases adopted from the outset. In most cases an experiment was first made with two or more diseases, and others were afterwards added to the list. To take the case of Nottingham; compulsory notification received legal sanction in 1878, but was not put in force until 1882. Small-pox and scarlet fever were made notifiable in 1882, enteric and typhus fevers in 1883, and cholera and diphtheria in 1885. This limitation was doubtless in some measure due to the inconvenience experienced in some towns which, like Jarrow,



had adopted "the compulsory notification of infectious diseases" without sufficient definition of the last term.

The diseases more commonly notified under local Acts have been small-pox, cholera, typhus, scarlet fever, diphtheria, and typhus fever. Under the Act of 1889 membranous croup, erysipelas, relapsing, continued, and puerperal fevers have been added to the above. Power has also been given to sanitary authorities, with the sanction of the Local Government Board, to further expand the list by the inclusion of other infectious diseases, such as whooping cough and measles.

There is doubtless much yet to be learnt from the systematic study of the prevalence and fatality of many diseases of this class in conjunction with varying conditions of social and physical surrounding, of climate, season, soil, and food supply, and therefore ample grounds for adopting a general notification and registration of cases.

We must, however, guard ourselves, as well as warn the public, against supposing that the notification of all such diseases necessarily carries with it in any measure an element of prevention. The health records of our large notification towns during the past few years prove that for the present, at any rate, such is not the case.

The excellent diagrams handed in by Dr. Thorne Thorne to the Vaccination Commission, and published in their first report in 1889, show at a glance the range of mortality during the past 40 years, from several diseases in this list, for England and Wales, and are well worthy of a careful study.

Against only a very small section of this so-called zymotic class of ailments have suitable preventive measures been adopted, and in their case alone has there been a decline of prevalence and fatality.

There are, of course, a certain number of septic diseases which are found to diminish directly, as *a priori* we should expect them to, with improved sanitation; it is otherwise, however, with such complaints as whooping cough, measles, and even diphtheria.

The first two are apparently amenable to nothing but isolation, and for them this has never up to the present been seriously attempted. The issue of printed and verbal warnings, and the occasional closure of a school, may comfort the public, but they have very little effect upon the spread of these diseases in crowded urban districts at any rate.

Diphtheria, whatever may be the conditions under which it arises, or which are most favourable to its propagation, undoubtedly spreads very largely by personal contagion, and prophylaxis without means of isolation is practically of no avail. But, means of isolation provided, the difficulty remains of determining the diagnosis of mild and doubtful cases. The number of notified cases which it is found necessary on subsequent inquiry to eliminate from the notification register is larger with diphtheria than with any other disease.

This difficulty seems likely to be a serious hindrance to the effectual preventive treatment of diphtheria, and the disease is steadily

and ominously on the increase in London and many other town districts.

Enteric fever is undoubtedly fostered by insanitary conditions, and on this assumption its notification in any house or locality is often made the occasion of inquiry, inspection, and remedial action, but to what a limited extent only such action is possible the condition of the poorer parts of many of our large towns too plainly testifies. A great deal of endemic typhoid fever is often required, for instance, to induce a sanitary authority to recognise the desirability of abolishing midden-privies, of re-organising a defective system of drainage, or of providing a public water-supply. Much of the work, too, which passes for sanitary improvement in our towns is open to the suspicion of belonging to the order of innovations which are not improvements. For instance, it seems to me of very questionable advantage to seal the surface of roadways, yards, and passages lying over refuse material, frequently containing much organic matter, which has been used to raise the level of low-lying ground, and to leave the basements of houses built upon the same soil entirely without protection against the access of ground air; yet this is often done at the present time. When we consider also that leakages from sewers, cesspools, privies, and gas pipes are by no means of infrequent occurrence, the possible danger from such a practice assumes additional magnitude. There is, however, one fact worthy of notice in connexion with typhoid fever for which we should be grateful. Whether it be in town or country there is seldom much difficulty in securing its notification. Impressed with the belief that some discoverable cause must exist, both the medical attendant and his clients are for the most part too anxious to secure its removal to think about concealment of cases.

Scarlet fever and small-pox are the two diseases against which, in recent times, prevention has chiefly directed its energies. Vaccination, isolation, and disinfection in the first, and isolation and disinfection in the second, are the agents by which it has worked.

In the case of small-pox, so great is the popular dread of the disease, that but little difficulty has been experienced in enforcing either vaccination or isolation, or both together, according to the trend of local opinion. The value of notification, when associated with isolation, quarantine, and disinfection, completely carried out, finds striking illustration in the immunity of Leicester from small-pox in recent years. With scarlet fever the case is different. Many towns are now supplied with a large amount of hospital space specially provided for it, and a considerable number of patients are undoubtedly isolated, but even in the case of those towns furnished with the best and most ample accommodation the actual proportion of admissions to total cases has, until quite recently, been exceedingly small. The following figures for Nottingham, where a large number of scarlet fever beds have long been provided in the town isolation hospital, strongly support this contention.

Year.	Number of Cases notified.	Number removed to Hospital.	Per-centage of Removals.
1882* - - -	1,029	56	5·4
1883 - - -	456	6	1·3
1884 - - -	370	24	6·4
1885 - - -	390	47	12·0
1886 - - -	351	51	15·0
1887 - - -	615	275	45·0
1888 - - -	643	318	49·0
1889 - - -	1,047	745	71·0
1890 - - -	963	800	83·0

\* First year of compulsory notification.

Isolation hospitals then have existed in the majority of our large towns for many years past, but their accommodation has not been sufficiently good or ample and they have not been at all generally used, except for such diseases as typhus and small-pox, until within the past few years. A study of the recent health reports of almost any of these large towns will show the truth of this, and will further suggest that the practical adoption by the general public of the principle of hospital isolation in lieu of home nursing, even in the case of those diseases for which many hospitals are now specially provided, must not be looked for at once. These hospitals have too often been temporary structures of a comfortless if not forbidding aspect, economy in building with a view to early destruction (which was seldom carried out), having been the object of first consideration with the builders. That, however, was a mistaken policy; the hospital must be made, if possible, more attractive and healthier than the home. When this is done, as I am pleased to say, in some cases, it now has been, we shall begin—slowly at first, but certainly and completely in the long run—to secure the end we have in view, viz., the general acceptance of the principle of hospital isolation for the infectious sick of all classes.

Recent experience has taught us that permanent hospitals, replete with every modern comfort and convenience, can readily, and much more readily than the temporary buildings, be kept clean and healthy, and they may with certain precautions be safely used alternately for different diseases. The required ratio of beds to population has been variously stated. Dr. Buchanan, in 1876, laid it down that one bed per 1,000 would probably be the general requirement of the country as a whole. His estimate has been considered excessive, but if it has actually proved to be so in any instance, this will probably have arisen through neglect to use the hospital, and not through a lack of suitable cases for isolation.

In estimating, however, the amount of hospital accommodation required by any particular locality it is always necessary to take into consideration such points as the class, occupation, and density of the population, and the local history of endemic and epidemic disease, the mere mention of which are sufficient to suggest the impossibility of laying down a rule applicable to all cases.



The statistics for the country as a whole, as well as those for particular localities, as I have already stated, all go to show that the only modern zymotic diseases which have declined during recent years are (a) those which are known to depend on insanitary conditions for their propagation, and which, therefore, the improved sanitation of modern times will have had the effect of reducing, and (b) those among the personally contagious class for which isolation, and, in the case of small-pox, vaccination, have been practised.

It is altogether too early at present to attempt to estimate the full potential value of notification by an appeal to statistics, but adopting the criteria mentioned above, they are found to yield a result by no means unfavourable to it. Scarlet fever and small-pox have markedly declined in the majority of the notification towns.

If we compare the scarlet fever death-rates of the 10 larger notification towns mentioned above in the nine years 1873-81, prior to notification, and in the nine years 1882-90, subsequent for the most part to its adoption, with the corresponding rates of the remaining nine non-notification towns, of which particulars are given by the Registrar-General, we obtain a result strikingly in favour of the former group. I give averages of the death-rates, and not average rates, in order to make due and proportional allowance for the varying experience of separate populations of widely different numerical values.

This method applied to the case under consideration has, I am aware, met with criticism from professional statisticians, but I fail to see how the value of the figures for different towns of various sizes which have made the experiment of exercising certain precautions against the spread of infectious disease under different circumstances of liability, incidence, fatality, and the like, with different degrees of efficiency, can be duly expressed without it. In denoting chemical results, the prices of articles in daily use, the liability to crime among the several classes of society, such a method is accepted without cavil. Why not here?

## TEN NOTIFICATION TOWNS.

Average of the death-rates, 1873-81	-	0.93
Do. do. 1882-90	-	0.37
Decrease per cent.	-	60.3

		Increase or Decrease per Cent. in the Scarlet Fever Death-rates during the Nine Years 1882-90, as compared with 1873-81.
Bradford	- - -	-76
Norwich	- - -	-83
Nottingham	- - -	-60
Portsmouth	- - -	-77
Leicester	- - -	-60
Manchester	- - -	-49
Salford	- - -	-48
Oldham	- - -	-69
Sunderland	- - -	-66
Newcastle	- - -	-66

## NINE NON-NOTIFICATION TOWNS.

Average of the death-rates, 1873-81	-	-	·87
Do. do. 1882-90	-	-	·44
Decrease per cent.	-	-	49·5

	Increase or Decrease per Cent. in the Scarlet Fever Death-rates during the Nine Years 1882-90, as compared with 1873-81.
Brighton - - -	- 38
Plymouth - - -	+ 138
Bristol - - -	- 60
Wolverhampton - - -	- 74
Birmingham - - -	- 71
Liverpool - - -	- 54
Leeds - - -	- 31
Sheffield - - -	- 37
Hull - - -	- 66

The figures for small-pox, as might perhaps have been expected, are more favourable even than these, although I have included those for 1880 and 1881 in the last group, in order to introduce the epidemics of those years.

## TEN NOTIFICATION TOWNS.

Average of the death-rates, 1873-82	-	0·067
Do. do. 1880-89	-	0·035
Decrease per cent.	-	48

## NINE NON-NOTIFICATION TOWNS.

Average of the death-rates, 1873-82	-	·071
Do. do. 1880-89	-	·048
Decrease per cent.*	-	36

If we take the numbers of deaths instead of the death-rates, the results obtained are nearly identical. The average decrease per cent. in the deaths from scarlet fever for the nine non-notification towns is -46 (that for London being also the same), and the average decrease in the 10 notification towns -55.

The corresponding small-pox figures are: for the nine non-notification towns -36, for London -71, and for the 10 notification towns -52.

The advantages to be gained from notification are so many and so great, and at the same time so manifest, that it would be an act entirely of supererogation to offer to demonstrate them by an appeal to statistics, were it not that attempts have been made to discredit the whole system by such agency.

It must be apparent to any thoughtful person who devotes attention to the subject, that notification, with isolation, disinfection, and the whole armament of sanitary precautions, are the natural and legitimate outcome of evolution as applied to preventive medicine. Powers have

been conferred under the earlier Public Health Acts which it would be impossible to exercise with due advantage to the community without the help of such a measure as compulsory notification. By it the sanitary authority is simply made aware of the existence of diseases which are known to be more or less preventable, which it is everyone's wish to prevent, and with the spread of which the authority alone possesses the means to cope.

Whatever the suspected vehicle of contagion, whether it be air, food, water-supply, or household fomites, officers of the authority alone can make effectual investigation, and enforce the observance of necessary precautions. They alone can keep watch over the sources of water, milk, and food, can act upon the suggestions afforded by concentration of cases around schools, factories, and the like places, or among the customers of milk sellers and other tradesmen. They alone can secure the reform of insanitary conditions found in connexion with those diseases known to be fostered by such agencies. In fact, I repeat that it must be apparent to all, who have eyes to see, that the sanitary authorities alone can exercise due control of infectious diseases as affecting the community, and that without compulsory notification any such work that they do must be done at a great disadvantage.

The history of compulsory notification has hitherto failed to justify the evil predictions that have been made concerning it. Medical men continue to notify, and yet retain the confidence of their patients. In many cases they are glad to have removed from their shoulders the responsibility of deciding upon the precautions to be taken. Only a very small proportion of cases are concealed, and most deaths from infectious diseases are certified correctly. Friends and neighbours, clergymen, and others, it must be remembered, are often alive to the necessity of reporting cases, even if the persons directly responsible are not.

In non-notification towns, owing to the facilities for concealing cases during life, it will often happen that deaths are certified as due to complications instead of the original disease. I have known this to occur on more than one occasion, and can conceive the possibility of its more or less general practice where sufficient inducement exists. However this may be, it certainly stands to reason that the small amount of concealment that is possible in towns with notification, will be less injurious to the community than the general concealment that is going on in those without it.

All the arguments urged against compulsory notification bear the impress of the weak case that lies behind them. Like every other desirable innovation, it was and is certain to meet with opposition, but the opposition it now has to face is as nothing compared with the storm which attended its first introduction, or that even of civil registration.

When compulsory notification was first adopted in Nottingham, the whole local profession rose in arms against it. During the present year an opponent of the new town hospital scheme, in a full meeting of the Medical Society, was unable to find a supporter in criticising the work of compulsory notification and isolation in Nottingham. Let us not



fear opposition. No good cause ever yet throve without it, and that our cause is good we have evidence in the fact that its sole aim is to promote the health and welfare of the community.

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### Should Compulsory Notification be made General?

BY

D. BIDDLE, M.R.C.S., Eng.

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The question upon which I have undertaken to make a few remarks is this: "Should Compulsory Notification be made general?" And, at the outset, I would ask you to dismiss from your minds, as far as possible, all prejudices and prepossessions on the subject, and endeavour to view the question scientifically. Compulsory notification has been in the crucible for the last 15 years, and I am going to give you very briefly a qualitative and quantitative analysis of the results which have followed the experiment in the large towns of England.

What effect has compulsory notification had upon the death-rates, general and zymotic? The 28 large towns of England afford an admirable field in which to observe, since until last year, 11 (including London) remained under no system of notification, and 14 had, for four years at least, been under the dual system, which, as I have said before, is the system embodied in the Notification Act of 1889, which throws the burden of notification upon the medical attendant chiefly, and upon the householder only nominally.

Taking the seven principal zymotic diseases, four are *notifiable*, namely, small-pox, scarlet fever, diphtheria, and "fever" (chiefly enteric), and three are *non-notifiable*, except in rare instances, namely, measles, whooping-cough, and diarrhoea. In regard to 20 of the large towns, I have calculated the requisite death-rates, corrected by the recent census returns, for a period of 20 years, 1871-90; and those of the 8 additional towns for nine years, that is to say, from 1882, the earliest year for which in their case the Registrar-General gives us the needed data. I have also prepared various group-averages, by the aid of which results can be compared in groups of towns having populations extending to millions on either side, and for a period long enough to enable us to arrive at an accurate judgment in the matter. This period begins five years before the Public Health Act of 1875 came into force, also before the Vaccination Act was rendered more stringent. Thus, the effects of those sanitary measures can be compared with the results of the later system.

In the first place, however, it may be well to indicate, as far as practicable, what proportion of deaths the several kinds of infectious disease have been answerable for, irrespective of notification, in the 20 large towns of which we have full data. Taking the average of the whole period of 20 years, out of 1,000 deaths 161 were certified as due to zymotic disease, and, of those, 59 as due to the notifiable class, namely, 10 to small-pox, 26 to scarlet fever, 7 to diphtheria, and 16 to

“fever” (chiefly enteric); whilst measles accounted for 25, whooping-cough for 30, and diarrhœa for 46. But great changes have taken place in the proportions during the period of 20 years, which can best be exhibited by giving the numbers per 1,000 *deaths* for each of the four quinquennia in succession:—

—	1871-75.	1876-80.	1881-85.	1886-90.
Total zymotic - -	193	165	150	137
Notifiable zymotic - -	87	63	52	37
Non-notifiable zymotic - -	106	102	98	100
Small-pox - - -	25	8	7	1
Scarlet fever - - -	33	33	23	15
Diphtheria - - -	4	5	8	11
Fever - - -	25	16	14	10
Measles - - -	20	22	28	30
Whooping-cough - -	30	34	30	28
Diarrhœa - - -	56	46	40	43

We shall see, presently, how much, or rather, how little of the improvement here apparent in regard to notifiable diseases is due to the system of compulsory notification embodied in the Act of 1889. I may mention that during the last of the four quinquennia, 1886-90 (the only one strictly allowed us for comparison) the proportions in the 28 large towns were almost identical with those above given for the 20 towns taken separately.

Turning now to the death-rates per 1,000 *living* in the same 20 towns, we find that the means for the four quinquennia, (1) from all causes, (2) from zymotic diseases as a whole, and (3) from notifiable diseases, were as follows:—

—	1871-75.	1876-80.	1881-85.	1886-90.
All causes - - -	24·81	23·26	21·84	21·19
Total zymotic - - -	4·79	3·84	3·27	2·91
Notifiable zymotic - -	2·17	1·47	1·13	0·78

From this we see that a large part of the reduction occurred before notification appeared on the scene, and much more before the dual system had made its way in the towns. They must be infatuated notificationists, indeed, who will take credit to themselves for the marked reduction in the death-rate from small-pox, which was actually 2·07 in the year 1871, but on the average only 0·023 in the last quinquennium, notwithstanding the high rate in Sheffield during two of the five years. If the notificationists do take credit for this, I beg respectfully to differ from them. During the 20 years, the blanks—indicative of *no deaths* from that disease—are almost, if not quite, as numerous outside the area of notification as within it. Moreover, of the seven chief towns which came under the dual system by local Acts, Manchester was the only town which had not recorded numerous blanks before notification was introduced; and even in the case of Manchester there were two

years, prior to notification, in which the death-rate from small-pox was 0·00, and two more in which it did not exceed 0·01. In the pre-notification period, Sunderland had 7 blanks, Portsmouth 5, Newcastle 5, Salford 2, Oldham 2, Leicester 5. No, I cannot believe that the Congress will endorse any such claim as that to which I have adverted, so far as small-pox is concerned. The reduction in the death-rate from that disease has been due to a far more potent factor (for good) than notification. As to the other notifiable diseases, I think I can, if time be allowed, make the matter equally clear.

Now, there were four years, 1886-89, in which 14 of the large towns had the full benefit of the dual system, in a form matured by several years' experience; and it so happens, that not only for these four years, but for the four years immediately preceding them, the Registrar-General has supplied us with full data in regard to all those towns. The 14 towns referred to, are the seven above-mentioned, and in addition, Bolton, Blackburn, Derby, Preston, Huddersfield, Birkenhead, and Halifax. Together they form Group III. of my tables; whilst Group II. consists of the three towns which came under the single system only, namely, Bradford, Norwich, and Nottingham; and Group I. consists of London, Bristol, Wolverhampton, Birmingham, Liverpool, Sheffield, Hull, Plymouth, Brighton, Leeds, and Cardiff, which 11 large towns of England remained under no system of notification until after the passing of the Notification Act of 1889. Brighton and Leeds maintained their independence through 1890, and Leeds does so still, I believe. It is a singular circumstance, that these two towns, Brighton and Leeds, continued to decline in their death-rates from notifiable diseases in 1890, whilst the other provincial towns of Group I. ran up, except Plymouth, which had a preternaturally high death-rate the year before, owing to the epidemic of scarlet fever. London declined from 0·72 in 1889 to 0·70 in 1890, but Bristol ran up from 0·37 to 0·40, Wolverhampton from 0·33 to 0·35, Birmingham from 0·61 to 0·75, Liverpool from 1·18 to 1·55, Sheffield from 1·11 to 1·21, Hull from 0·37 to 0·39, and Cardiff from 0·39 to 0·40; whereas Brighton declined from 0·42 to 0·33, and Leeds from 0·72 to 0·64. Of course, I do not attach much importance to this, but even a straw will show the direction of the wind, and it is quite clear that, so far as 1890 is concerned, the large towns which adopted the Notification Act derived no benefit therefrom.

Coming now to consider the four years preceding 1890, namely, 1886-89, I am able to show that the group-average death-rate from notifiable diseases of the 14 large towns under the dual system was higher than that of the 11 large towns under no system of notification, not only in one of the four years, but in each of the four years! In 1886, the respective death-rates of the two groups from notifiable diseases were 0·775 and 0·639, showing that the towns under the dual system lost, in that year, 136 per 1,000,000 more persons from notifiable diseases than died of the same diseases in the towns under no system of notification. In 1887, the respective death-rates were 1·009 and 0·816, showing an excess of 193 per 1,000,000. In 1888, the respective death-rates were 0·905 and 0·778, showing an excess of 127 per



1,000,000. In 1889, the respective death-rates were 0·933 and 0·771, showing an excess of 162 per 1,000,000. Taking the respective mean death-rates from notifiable diseases in the two groups during these four years, which I find to be 0·906 in the 14 towns under the dual system, as against 0·751 in the 11 towns under no system, it is apparent that the average excess on the part of the former group was 155 per 1,000,000 per annum. In other words, for equal populations the loss from the four notifiable diseases, taken together, was more than 20 per cent. greater (to be precise, 20·6 per cent. greater) in the towns under the dual system than in the towns under no system of compulsory notification whatever. Yet the latter group had a denser population, 40·04 persons to the acre (in 1881), as against 26·95 in the former group; and I beg you to observe that the state of things which I have described was a reversal of previous relations between the same towns. Not only was the death-rate from what we call notifiable diseases lower in the seven chief towns of Group III., than in the nine provincial towns of Group I., during the first quinquennium of the 20 years under present review (2·591 as against 2·693), but even so lately as during the period of four years, 1882-85, immediately preceding that grievous period of equal length just considered, the 14 towns of Group III., as a whole, had a better, that is, a lower death-rate from those diseases than the 11 towns of Group I. as a whole, the respective mean rates for that period being 0·934 and 1·087. At the beginning of that period, however, five of the 14 towns of Group III. had not come under the dual system, namely, Sunderland, Portsmouth, Newcastle, Salford, and Halifax. Not until its close were they completely under the system, and then, as we have seen, the tables were turned, there was a signal *volte face* on the part of the two groups. In 1885, the superiority of Group III. was fast disappearing, its notifiable zymotic death-rate being then only 9 per 1,000,000 better than that of Group I. (0·757 as against 0·766). When Group III. came completely under the dual system, its superiority in this respect was a thing of the past, unless, indeed, under existing circumstances, it may again re-assert itself. Group I. has not yet had time to suffer the full penalty of its defection from the path of safety and distinction.

The particular notifiable diseases which led to the comparatively high death-rate of Group III. in the second period of four years, were scarlet fever and the class entitled "fever" (chiefly enteric). Thus, whilst the mean death-rate from scarlet fever, for 1886-89, of Group I., under no system of notification, was 0·301, that of Group III. was 0·405 (more than 31 per cent. in excess); and whilst the mean death-rate from "fever" for the same period was 0·192 in Group I., it was 0·297 in Group III. under the boasted dual system (more than 54 per cent. in excess). In small-pox and diphtheria, Group III. had the advantage, though a slight one: in small-pox, 0·016 as against 0·033, both very low; and in diphtheria, 0·188 as against 0·225. But to show that compulsory notification has little effect in restraining diphtheria, I need only mention that the death-rate from this disease has increased greatly in the towns under the dual system, as well as in those under no system;

but London, Manchester and Salford, Portsmouth, and Plymouth seem to have suffered most from it of late. In the 20 towns the death-rate from diphtheria in 1886-89 was greater than from "fever" (0·218 as against 0·212), but in the 28 towns slightly lower (0·209 as against 0·219). It seems to be a disease attributable to misdirected sanitation rather than to the absence of sanitary arrangements. Cows and milk, and the kissing of cats, had place in the world before diphtheria became so common; but open gratings, imperfect gulleys and traps, and sewer ventilation generally, are of comparatively recent origin. Diphtheria has increased as typhus and typhoid have declined, but the death-rate from the two classes combined is not nearly so great now as that from "fever" alone formerly.

A further contrast between the two periods of four years, 1882-85 and 1886-89, will show that compulsory notification and its abettors have much to answer for. In Group I., under no system of notification, the number of deaths from zymotic diseases as a whole was lower in the second period than in the first by 10 per cent., although the population had advanced 4 per cent. In Group III., on the contrary, the number of deaths from zymotic diseases advanced with the population *pari passu*, both increasing 7 per cent. In Group I., the number of deaths from notifiable diseases declined 28 per cent., whereas in Group III. there was a rise of 4 per cent. In Group I. the deaths from scarlet fever declined in number 35 per cent., but in Group III. they increased in number 3 per cent. In Group I. the number of deaths from "fever" declined 32 per cent., but in Group III. only 12 per cent. Is not this sufficient to show that the decline in death-rates, which had been almost universal in this country, received a serious check in those towns which came under the dual system of notification? There cannot be two opinions about it. Nor must it be imagined that the group to which London belonged would on that account necessarily appear to advantage, for London did not in all respects surpass the provincial towns of Group I. The latter declined in the number of deaths from scarlet fever 37 per cent., whilst with London included, the group declined only 35 per cent.; and in the case of "fever," the provincial towns declined 33 per cent. in the number of deaths, as against 32 per cent. on the part of Group I. with London included, upon a comparison of the two periods of four years above mentioned.

A very good way of showing the true progress made in any group, and also in any single town, is to compare the mean death-rates in yearly descending quinquennia. I have done this for London and the nine chief provincial towns of Group I. taken together, for the nine provincial towns taken by themselves (leaving London out), and for the seven chief towns of Group III. taken together, so as to see how the several groups have progressed from the period 1871-75 to 1886-90. By the method adopted a continuous decline appears unless the death-rate of some year be higher than that of the fifth year preceding. The general death-rate of the nine provincial towns of Group I. is thus shown to have declined without any serious break—the death-rate of no year having been higher than that of five years before—until 1890 was

reached, when the group having come under the dual system almost entirely, the tide turned, and the death-rate from all causes was higher than it had been for 12 years (1878). The death-rate of this group from notifiable diseases declined regularly also from 1878 onwards until 1890, when it rose conspicuously above the rate of the fifth year preceding, though not above one of the years intervening. In regard to scarlet fever, the seven chief towns of Group III. began with a mean death-rate 71 per 1,000,000 lower than that of the nine provincial towns of Group I., were higher by 12 per 1,000,000 in 1885-89, but again lower by 109 per 1,000,000 in 1890, when most of the towns of Group I. had come under the Notification Act. In regard to "fever," the seven towns of Group III. were lower than the nine provincial towns of Group I. by 29 per 1,000,000 in 1871-75, but higher by 75 per 1,000,000 in 1885-89, which difference was not reduced in 1890, having been dependent upon a comparative state of things not to be altered in a day, or even a year.

The above is a brief outline of what my tables, drawn up on a very elaborate scale, prove. In addition, I went into the subject of *uncertified deaths*, and found that during 1886-89 the per-centage of these to total deaths was higher in Group III. than in Group I., the mean per-centages being respectively 2.84 and 2.01. But I do not press this, because there is no proof in my possession that the uncertified deaths were, any of them, due to notifiable diseases, or that they increased in number by reason of notification.

Now, if the difference which I have sketched, between Group I. and Group III., was due, as maintained by some, to the better means of isolation possessed by the former, which I am far from admitting, it only shows that compulsory notification is not needed, that the people will avail themselves of the proffered benefit without being dragooned. But I maintain that the figures produced (by no means all I have of a similar kind) strongly condemn the dual system of notification, as hitherto carried out in the large towns of England, and make it difficult to understand how the Infectious Diseases (Notification) Bill came to be promoted in 1889, much less passed. The facts I have adduced were within the reach of anyone who chose to investigate the matter, and they make the failure of the system one of moral certainty, if not of demonstration.

Nor need we wonder at it. The principle of the dual system is dishonouring to the profession. It is a commingling of official with private duties which neither we nor our fathers have been able to bear; and I am glad to see from a paragraph in the "British Medical Journal" that our *confères* on the other side of the Silver Streak are taking the same view of it. "The Paris Society of Practical Medicine and a local medical society have addressed a petition to the Senate on the subject, in which they state that the notification of cases of infectious disease, besides being a violation of the *secret médical*, is useless and impossible for medical practitioners to carry out, and they argue that the duty should devolve on sanitary officials appointed for the purpose." (*Vide* "British Medical Journal," July 11, 1891, p. 83.)



## TABLES

SETTING FORTH THE FACTS UPON WHICH THE FOREGOING PAPER  
IS BASED.

The following Tables give the death-rates, general and zymotic, of the large towns of England for the twenty years 1871-90. They are constructed from the annual summaries of the Registrar-General so far as the number of deaths from the several causes is concerned; but the populations from which the death-rates are derived are not those estimated and given in the several summaries, which have proved in many instances very fallacious, but consist of two geometric series, 1871-81, 1881-91, formed by reference to the enumerated populations of the terminal and intermediate censuses of the period, after the manner adopted by the Registrar-General for correction of death-rates after every census. The statistics are thus placed on an impregnable basis. The group-averages are in every case obtained by comparing the total number of deaths from the particular disease, in the given year, *in all the towns of the group*, with the corresponding total population divided by 1,000. The group-averages of the twenty large towns have been carried through the whole period, and supplementary averages have been provided, from 1882 onwards, for the groups affected by the eight additional towns, of which the Registrar-General then gave the full data for the first time. Moreover, in Group I., averages are given for the provincial towns by themselves, as well as for the group as a whole, including London, the better to compare with the other groups, which consist of provincial towns only.

The tables will prove useful for reference in all cases in which zymotic death-rates for the given period are in question, because they include the non-notifiable as well as the notifiable zymotic diseases, and give the special death-rates for each in every one of the large towns throughout the period, so far as the Registrar-General has supplied the requisite data.

The following is a list of the tables :—

- I. DEATH RATES.—GENERAL (from all Causes).
- II. Do. TOTAL ZYMOTIC.
- III. Do. NOTIFIABLE ZYMOTIC.
- IV. Do. NON-NOTIFIABLE ZYMOTIC.
- V. Do. SMALL POX.
- VI. Do. SCARLET FEVER.
- VII. Do. DIPHTHERIA.
- VIII. Do. "FEVER" (chiefly ENTERIC).
- IX. Do. MEASLES.
- X. Do. WHOOPING COUGH.
- XI. Do. DIARRHŒA.
- XII. MEAN DEATH RATES for each of the FOUR QUINQUENNIA.  
PART I.—GENERAL, TOTAL ZYMOTIC, NOTIFIABLE ZYMOTIC,  
NON-NOTIFIABLE ZYMOTIC.  
PART II.—SMALL POX, SCARLET FEVER, DIPHTHERIA,  
"FEVER."  
PART III.—MEASLES, WHOOPING COUGH, DIARRHŒA.
- XIII. CONTRAST between two PERIODS of four years each.
- XIV. COMPARISON of DEATH RATES in YEARLY-DESCENDING  
QUINQUENNIA.
- XV. PROPORTION of ZYMOTIC to TOTAL DEATHS in four  
QUINQUENNIA.
- XVI. PROPORTION of ZYMOTIC to TOTAL DEATHS in two periods  
of four years each.
- XVII. UNCERTIFIED DEATHS.

TABLE I.—DEATH RATES.—GENERAL.

TABLE giving for the LARGE TOWNS OF ENGLAND the DEATH RATES from ALL CAUSES in each of the Twenty Years 1871-90, together with several Group Averages for each Year. Group I.—Towns under *No System* of Notification until after the passing of the Infectious Diseases (Notification) Act of 1889. Group II.—Towns under the *Single or Householder System*. Group III.—Towns which by local Acts have gradually come under the *Dual System* of Notification.

The towns concerning which the Registrar-General gives imperfect Data are recessed, as also are the Group Averages including them.

The black mark (I) indicates the time at which the particular system of Notification came into force in the several towns of Groups II. and III.

Large Towns and Number of Persons to an Acre in 1881.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.
(a.) Twenty towns	26.36	23.58	24.25	24.83	25.03	23.43	22.60	24.12	23.56	22.61	21.71	22.38	21.86	22.30	20.97	21.46	21.49	19.98	20.06	22.98
GROUP I.																				
(A.) Towns 1-10	25.80	22.78	23.68	24.22	24.47	22.86	22.24	23.91	23.36	22.08	21.58	22.02	21.60	21.96	20.53	21.00	20.97	19.61	19.47	22.59
1. London	24.7	21.4	22.8	22.5	23.7	22.0	21.6	23.2	23.4	21.9	21.2	21.6	20.6	20.7	20.3	20.4	20.7	19.4	18.3	21.5
(r.) Nine Provincial towns - 30.34	27.89	25.23	26.04	27.48	26.30	24.59	23.66	25.69	23.90	23.08	22.25	23.01	23.26	23.50	21.31	21.95	22.24	20.24	21.62	23.97
2. Bristol	23.2	22.2	23.6	25.2	27.3	23.1	22.5	22.0	23.3	20.9	19.6	19.4	18.1	18.8	20.1	19.9	21.2	17.6	18.5	20.2
3. Wolverhampton	22.4	28.0	25.9	26.8	24.7	24.0	24.4	25.4	23.3	21.2	21.2	22.4	21.7	22.0	20.4	22.4	21.9	20.9	20.8	22.2
4. Birmingham	22.4	28.0	25.9	26.8	24.7	24.0	24.4	25.4	23.3	21.2	21.2	22.4	21.7	22.0	20.4	22.4	21.9	20.9	20.8	22.2
5. Liverpool	35.1	27.1	26.3	26.8	27.5	27.6	26.4	29.0	27.2	26.9	26.6	27.0	23.1	23.6	20.1	20.9	20.7	18.9	20.0	22.4
6. Hull	14.5	28.3	26.3	27.6	25.8	25.5	26.6	26.1	23.3	22.9	21.0	21.7	23.1	22.6	21.1	20.6	22.2	21.1	21.5	27.9
7. Sheffield	42.7	23.2	28.1	24.2	25.5	22.7	21.5	24.1	22.4	23.4	23.8	23.2	22.6	20.6	17.0	18.6	18.8	16.1	19.9	18.8
8. Plymouth	53.0	24.0	22.3	22.6	20.9	22.3	21.8	25.8	23.3	25.0	19.8	21.9	20.7	20.6	17.6	22.8	21.8	21.4	16.2	21.3
9. Brighton	45.9	22.5	19.3	22.6	20.9	22.3	21.8	21.3	19.4	19.7	19.0	21.9	19.5	18.5	17.6	17.8	17.7	17.1	16.2	19.2
10. Leeds	14.4	28.4	28.3	29.3	26.9	25.9	22.9	24.8	23.8	22.1	21.5	19.6	19.4	22.9	20.3	20.3	19.5	17.8	16.6	17.5
11. Cardiff	17.7																			
(K.) Ten Provincial towns 23.45												22.88	23.13	23.53	21.46	21.95	22.19	20.20	21.46	23.75
(a.) Group I. as a whole - 40.04												22.99	21.56	21.99	20.60	21.02	20.96	19.60	19.45	22.55
GROUP II.																				
(c.) Group II. as a whole	18.66	25.78	25.80	25.60	26.63	23.37	22.02	22.48	22.50	23.47	20.72	22.59	20.57	22.98	20.21	21.77	21.02	19.26	19.87	21.26
12. Bradford	25.5	26.6	25.5	27.8	28.2	25.1	23.1	24.0	23.2	22.9	19.6	22.7	19.8	21.7	19.3	21.1	22.1	19.0	21.5	23.1
13. Norwich	11.8	25.9	26.3	23.3	24.3	21.7	20.7	24.4	22.1	24.1	19.4	24.1	19.4	20.8	19.9	22.6	19.8	19.4	17.7	20.0
14. Nottingham	18.9	26.0	22.3	23.7	26.1	21.9	21.1	20.1	22.1	23.8	22.4	24.1	22.2	24.3	21.3	22.2	20.8	19.5	19.6	19.3
GROUP III.																				
(d.) Seven towns	37.69	29.42	27.11	27.46	27.40	26.49	24.76	25.87	25.09	25.04	22.73	24.22	23.85	24.19	23.61	23.56	24.30	22.09	23.06	25.51
15. Sunderland	36.5	26.5	23.1	23.4	22.6	21.2	22.8	26.1	22.5	24.7	20.8	26.8	24.1	23.6	24.3	20.1	21.3	18.8	24.0	23.8
16. Portsmouth	28.6	23.1	18.5	20.8	20.1	22.8	18.0	20.0	17.9	19.7	19.6	21.3	18.2	18.8	18.9	22.6	18.3	17.5	16.7	17.8
17. Newcastle	27.1	32.2	30.7	29.5	26.6	23.3	22.9	24.4	24.8	22.8	21.7	22.6	21.8	22.2	23.2	20.9	23.5	18.7	22.7	23.1
18. Salford	34.4	30.4	25.2	28.9	28.1	29.7	22.8	22.9	22.5	22.4	22.7	23.9	23.5	24.1	23.2	25.0	23.6	24.9	24.8	27.6
19. Manchester	79.5	31.2	28.9	31.0	30.8	30.1	28.4	29.1	28.8	26.8	25.4	27.6	27.6	25.1	23.5	26.3	28.7	26.1	26.7	30.6
20. Oldham	24.8	24.9	25.1	28.2	27.6	27.0	22.5	21.8	19.1	19.9	22.8	23.1	22.7	23.5	23.3	24.4	23.9	22.3	22.9	24.0
21. Leicester	38.5	26.8	25.3	24.8	27.7	24.3	22.5	21.9	23.4	25.0	21.8	20.3	19.8	22.8	20.6	21.3	20.9	19.8	18.4	19.7
22. Bolton	36.5	27.1	25.3	24.8	27.7	24.3	22.5	21.9	23.4	25.0	21.8	20.3	19.8	22.8	20.6	21.3	20.9	19.8	18.4	19.7
23. Blackburn	13.2											25.4	21.7	24.3	22.2	23.0	21.5	21.8	22.2	26.1
24. Derby	22.9											18.9	18.5	19.0	18.8	19.1	18.1	17.3	17.5	20.0
25. Preston	25.2											27.6	25.5	27.0	26.8	28.6	27.6	23.7	29.7	27.1
26. Huddersfield	8.2											22.3	21.3	19.6	20.1	19.6	23.0	18.5	18.9	19.0
27. Brkhead	21.3											20.3	20.3	20.0	20.1	19.9	22.0	18.9	18.9	21.1
28. Halifax	22.8											20.4	20.0	20.0	20.1	19.7	22.8	21.0	21.6	22.5
(e.) Seven added towns - 17.53												22.72	21.82	23.07	21.32	22.93	22.88	20.77	22.37	23.49
(f.) Group III. as a whole 26.95												23.67	23.13	23.80	22.79	23.34	23.79	21.62	22.82	24.79
(h.) Twenty-eight towns	34.34											22.39	21.84	22.42	21.05	21.56	21.59	20.02	20.22	22.96







TABLE III.—DEATH RATES.—NOTIFIABLE ZYMOTIC.

TABLE giving for the LARGE TOWNS OF ENGLAND the DEATH RATES from NOTIFIABLE ZYMOTIC DISEASES in each of the Twenty Years 1871-90, together with several Group Averages for each Year. Group I.—Towns under *No System* of Notification until after the passing of the Infectious Diseases (Notification) Act of 1889. Group II.—Towns under the *Single or Householder System*. Group III.—Towns which have gradually come under the *Dual System* of Notification. The towns concerning which the Registrar-General gives imperfect Data are recessed, as also are the Group Averages including them. The black mark (I) indicates the time at which the particular system of Notification came into force in the several towns of Groups II. and III.

Large Towns and Number of Persons to an Acre in 1881.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.
(g.) Twenty towns	-	37-67																		
GROUP I.																				
(A.) Towns 1-10	-	40-86																		
1. London	3-604	1-771	1-197	2-087	1-739	1-417	1-502	1-652	1-312	1-248	1-502	1-193	1-234	1-140	0-761	0-634	0-821	0-780	0-777	0-775
2. Bristol	3-572	1-726	1-078	1-701	1-461	1-191	1-486	1-637	1-338	1-135	1-435	1-115	1-065	0-793	0-580	0-377	0-765	0-739	0-729	0-710
(L) Nine Provincial towns	30-34	2-606	1-928	3-369	1-990	1-638	1-361	2-090	1-318	1-122	1-231	1-283	1-532	1-130	0-688	0-761	0-927	0-760	0-885	0-895
3. Wolverhampton	40-6	1-719	0-935	1-785	1-327	2-069	1-366	2-097	1-446	1-142	1-499	1-044	0-463	0-500	0-338	0-505	0-730	0-535	0-367	0-440
4. Birmingham	42-3	1-739	0-985	1-785	1-327	2-069	1-366	2-097	1-446	1-142	1-499	1-044	0-463	0-500	0-338	0-505	0-730	0-535	0-367	0-440
5. Liverpool	27-9	1-739	0-985	1-785	1-327	2-069	1-366	2-097	1-446	1-142	1-499	1-044	0-463	0-500	0-338	0-505	0-730	0-535	0-367	0-440
6. Sheffield	106-3	1-739	0-985	1-785	1-327	2-069	1-366	2-097	1-446	1-142	1-499	1-044	0-463	0-500	0-338	0-505	0-730	0-535	0-367	0-440
7. Hull	14-3	1-01	1-165	1-739	1-327	2-069	1-366	2-097	1-446	1-142	1-499	1-044	0-463	0-500	0-338	0-505	0-730	0-535	0-367	0-440
8. Plymouth	42-7	1-01	1-165	1-739	1-327	2-069	1-366	2-097	1-446	1-142	1-499	1-044	0-463	0-500	0-338	0-505	0-730	0-535	0-367	0-440
9. Brighton	53-0	1-01	1-165	1-739	1-327	2-069	1-366	2-097	1-446	1-142	1-499	1-044	0-463	0-500	0-338	0-505	0-730	0-535	0-367	0-440
10. Leeds	44-4	1-01	1-165	1-739	1-327	2-069	1-366	2-097	1-446	1-142	1-499	1-044	0-463	0-500	0-338	0-505	0-730	0-535	0-367	0-440
11. Cardiff	17-7	1-01	1-165	1-739	1-327	2-069	1-366	2-097	1-446	1-142	1-499	1-044	0-463	0-500	0-338	0-505	0-730	0-535	0-367	0-440
(K.) Ten Provincial towns	29-45	1-77	1-01	1-739	1-327	2-069	1-366	2-097	1-446	1-142	1-499	1-044	0-463	0-500	0-338	0-505	0-730	0-535	0-367	0-440
(B.) Group I. as a whole	40-04	1-77	1-01	1-739	1-327	2-069	1-366	2-097	1-446	1-142	1-499	1-044	0-463	0-500	0-338	0-505	0-730	0-535	0-367	0-440
(c.) Group II. as a whole	18-66	2-933	2-910	1-838	2-537	1-297	1-027	1-016	1-223	1-543	1-453	1-189	0-592	0-601	0-660	0-576	0-644	0-567	0-545	0-495
12. Bradford	25-5	2-065	1-74	2-88	3-41	1-43	1-10	1-43	1-38	1-46	0-86	0-62	0-50	0-49	0-53	0-66	0-73	0-30	0-59	0-45
13. Norwich	11-8	4-24	0-84	0-53	0-97	1-18	1-48	0-56	0-80	2-67	0-94	0-19	0-20	0-51	1-17	0-67	0-79	0-65	0-43	0-62
14. Nottingham	18-9	3-25	0-85	1-23	2-39	1-18	0-51	0-81	1-27	1-08	2-26	2-23	0-88	0-74	0-55	0-44	0-50	0-79	0-54	0-52
GROUP III.																				
(d.) Seven towns	37-69	3-922	3-147	1-946	1-788	2-526	1-490	1-716	1-580	1-622	1-132	1-153	1-077	1-070	0-870	0-865	0-986	0-857	0-976	1-103
15. Sunderland	42-3	2-81	0-96	2-10	1-08	1-88	1-96	2-27	2-53	3-08	1-54	2-29	1-32	1-32	1-38	0-48	0-47	0-41	0-76	1-00
16. Portsmouth	28-6	5-71	1-47	1-41	1-39	4-36	1-07	0-90	0-65	0-82	2-27	2-01	1-03	0-81	1-06	1-43	0-58	0-30	0-52	0-73
17. Newcastle	27-1	6-57	1-36	2-89	1-33	0-99	0-90	2-33	2-40	1-22	0-88	0-93	1-40	1-76	1-49	0-59	0-73	0-30	0-49	0-61
18. Salford	34-4	3-66	1-65	2-13	2-92	4-10	1-87	1-70	1-43	1-97	0-95	0-93	1-35	1-35	0-77	1-29	1-37	1-33	2-34	2-04
19. Manchester	79-5	2-58	2-00	2-46	2-10	1-71	2-31	1-52	1-35	1-30	0-56	0-75	1-04	0-97	0-56	0-86	1-18	1-18	1-13	1-44
20. Oldham	24-0	1-84	1-84	1-43	1-79	1-97	1-05	2-50	1-39	1-20	1-58	0-84	0-66	0-52	0-48	0-71	1-50	1-07	0-69	0-96
21. Leicester	38-5	3-98	0-85	0-84	2-31	2-05	0-61	0-39	1-02	1-39	1-28	0-63	0-66	0-71	1-30	0-50	0-40	0-41	0-31	0-54
22. Bolton	36-5	3-98	0-85	0-84	2-31	2-05	0-61	0-39	1-02	1-39	1-28	0-63	0-66	0-71	1-30	0-50	0-40	0-41	0-31	0-54
23. Blackburn	13-2	2-81	0-96	2-10	1-08	1-88	1-96	2-27	2-53	3-08	1-54	2-29	1-32	1-32	1-38	0-48	0-47	0-41	0-76	1-00
24. Derby	22-9	5-71	1-47	1-41	1-39	4-36	1-07	0-90	0-65	0-82	2-27	2-01	1-03	0-81	1-06	1-43	0-58	0-30	0-52	0-73
25. Preston	25-2	6-57	1-36	2-89	1-33	0-99	0-90	2-33	2-40	1-22	0-88	0-93	1-40	1-76	1-49	0-59	0-73	0-30	0-49	0-61
26. Huddersfield	8-2	3-66	1-65	2-13	2-92	4-10	1-87	1-70	1-43	1-97	0-95	0-93	1-35	1-35	0-77	1-29	1-37	1-33	2-34	2-04
27. Birkenhead	21-3	2-58	2-00	2-46	2-10	1-71	2-31	1-52	1-35	1-30	0-56	0-75	1-04	0-97	0-56	0-86	1-18	1-18	1-13	1-44
28. Halifax	22-8	1-84	1-84	1-43	1-79	1-97	1-05	2-50	1-39	1-20	1-58	0-84	0-66	0-52	0-48	0-71	1-50	1-07	0-69	0-96
(E.) Seven added towns	17-53	3-98	0-85	0-84	2-31	2-05	0-61	0-39	1-02	1-39	1-28	0-63	0-66	0-71	1-30	0-50	0-40	0-41	0-31	0-54
(F.) Group III. as a whole	26-95	3-98	0-85	0-84	2-31	2-05	0-61	0-39	1-02	1-39	1-28	0-63	0-66	0-71	1-30	0-50	0-40	0-41	0-31	0-54
(G.) Group III. as a whole	26-95	3-98	0-85	0-84	2-31	2-05	0-61	0-39	1-02	1-39	1-28	0-63	0-66	0-71	1-30	0-50	0-40	0-41	0-31	0-54
(H.) Twenty-eight towns	34-34	3-98	0-85	0-84	2-31	2-05	0-61	0-39	1-02	1-39	1-28	0-63	0-66	0-71	1-30	0-50	0-40	0-41	0-31	0-54
(I.) Twenty-eight towns	34-34	3-98	0-85	0-84	2-31	2-05	0-61	0-39	1-02	1-39	1-28	0-63	0-66	0-71	1-30	0-50	0-40	0-41	0-31	0-54
(J.) Twenty-eight towns	34-34	3-98	0-85	0-84	2-31	2-05	0-61	0-39	1-02	1-39	1-28	0-63	0-66	0-71	1-30	0-50	0-40	0-41	0-31	0-54
(K.) Twenty-eight towns	34-34	3-98	0-85	0-84	2-31	2-05	0-61	0-39	1-02	1-39	1-28	0-63	0-66	0-71	1-30	0-50	0-40	0-41	0-31	0-54
(L.) Twenty-eight towns	34-34	3-98	0-85	0-84	2-31	2-05	0-61	0-39	1-02	1-39	1-28	0-63	0-66	0-71	1-30	0-50	0-40	0-41	0-31	0-54
(M.) Twenty-eight towns	34-34	3-98	0-85	0-84	2-31	2-05	0-61	0-39	1-02	1-39	1-28	0-63	0-66	0-71	1-30	0-50	0-40	0-41	0-31	0-54
(N.) Twenty-eight towns	34-34	3-98	0-85	0-84	2-31	2-05	0-61	0-39	1-02	1-39	1-28	0-63	0-66	0-71	1-30	0-50	0-40	0-41	0-31	0-54
(O.) Twenty-eight towns	34-34	3-98	0-85	0-84	2-31	2-05	0-61	0-39	1-02	1-39	1-28	0-63	0-66	0-71	1-30	0-50	0-40	0-41	0-31	0-54
(P.) Twenty-eight towns	34-34	3-98	0-85	0-84	2-31	2-05	0-61	0-39	1-02	1-39	1-28	0-63	0-66	0-71	1-30	0-50	0-40	0-41	0-31	0-54
(Q.) Twenty-eight towns	34-34	3-98	0-85	0-84	2-31	2-05	0-61	0-39	1-02	1-39	1-28	0-63	0-66	0-71	1-30	0-50	0-40	0-41	0-31	0-54
(R.) Twenty-eight towns	34-34	3-98	0-85	0-84	2-31	2-05	0-61	0-39	1-02	1-39	1-28	0-63	0-66	0-71	1-30	0-50	0-40	0-41	0-31	0-54
(S.) Twenty-eight towns	34-34	3-98	0-85	0-84	2-31	2-05	0-61	0-39	1-02	1-39	1-28	0-63	0-66	0-71	1-30	0-50	0-40	0-41	0-31	0-54
(T.) Twenty-eight towns	34-34	3-98	0-85	0-84	2-31	2-05	0-61	0-39	1-02	1-39	1-28	0-63	0-66	0-71	1-30	0-50	0-40	0-41	0-31	0-54
(U.) Twenty-eight towns	34-34	3-98	0-85	0-84	2-31	2-05	0-61	0-39	1-02	1-39	1-28	0-63	0-66	0-71	1-30	0-50	0-40	0-41	0-31	0-54
(V.) Twenty-eight towns	34-34	3-98	0-85	0-84	2-31	2-05	0-61	0-39	1-02	1-39	1-28	0-63	0-66	0-71	1-30	0-50	0-40	0-41	0-31	0-54
(W.) Twenty-eight towns	34-34	3-98	0-85	0-84	2-31	2-05	0-61	0-39	1-02	1-39	1-28	0-63	0-66	0-71	1-30	0-50	0-40	0-41	0-31	0-54
(X.) Twenty-eight towns	34-34	3-98	0-85	0-84	2-31	2-05	0-61	0-39	1-02	1-39	1-28	0-63	0-66	0-71	1-30	0-50	0-40	0-41	0-31	0-54
(Y.) Twenty-eight towns	34																			

TABLE IV.—DEATH RATES.—NON-NOTIFIABLE ZYMOTIC.

TABLE giving for the LARGE TOWNS of ENGLAND the DEATH RATES from NON-NOTIFIABLE ZYMOTIC DISEASES in each of the Twenty Years 1871-90, together with several Group Averages for each Year. Group I.—Towns under *No System* of Notification until after the passing of the Infectious Diseases (Notification) Act of 1889. Group II.—Towns under the *Single or Householder System*. Group III.—Towns which by local Acts have gradually come under the *Dual System* of Notification. The towns concerning which the Registrar-General gives imperfect Data are recessed, as also are the Group Averages including them.

The black mark (I) indicates the time at which the particular system of Notification came into force in the several towns of Groups II. and III.

Large Towns and Number of Persons to an Acre in 1881.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1885.	1887.	1888.	1889.	1890.
(G.) Twenty towns GROUP I.																				
(A.) Towns 1-10	2,742	2,729	2,579	2,261	2,441	2,431	2,037	2,761	1,969	2,564	2,003	2,364	1,790	2,516	1,971	2,242	2,416	1,771	1,884	2,203
1. London	2,34	2,55	2,62	1,94	2,28	2,27	1,85	2,68	2,02	2,35	1,95	2,37	1,71	2,32	2,05	2,20	2,38	1,87	1,63	2,19
(r.) Nine Provincial towns - 30-34	3,449	3,061	2,545	2,850	2,761	2,731	2,384	2,992	1,925	3,017	2,085	2,363	1,942	2,811	1,876	2,307	2,510	1,634	2,341	2,153
2. Bristol	1,59	1,87	1,82	1,42	1,74	1,75	1,56	1,52	1,59	1,79	1,19	1,76	0,82	1,33	1,18	1,50	1,03	0,78	1,87	1,74
3. Wolverhampton	2,22	2,18	1,81	2,64	2,32	2,58	1,30	2,75	1,74	2,14	1,24	1,76	0,82	1,33	1,18	1,50	1,03	0,78	1,87	1,74
4. Birmingham	4,79	4,10	2,90	2,77	3,85	2,50	2,94	3,03	2,02	2,67	2,01	2,51	1,80	3,23	1,72	2,85	2,81	1,75	2,26	2,26
5. Liverpool	106-3	4,15	2,82	3,60	2,57	3,59	2,92	3,44	2,08	3,59	3,01	2,62	2,81	3,68	2,72	2,98	3,26	2,07	2,72	2,60
6. Sheffield	3,65	3,12	3,12	2,69	2,49	2,88	1,97	2,66	2,12	3,21	2,21	1,87	2,02	2,24	2,18	2,27	2,47	1,61	2,25	2,36
7. Hull	4,27	3,39	3,12	2,42	3,19	2,47	2,22	3,29	1,35	4,72	1,18	2,69	2,22	2,61	0,68	1,94	2,23	0,63	2,63	1,41
8. Plymouth	53-0	1,56	1,70	4,03	1,68	2,32	1,52	2,31	1,42	5,81	1,07	1,70	1,61	1,46	1,72	1,93	1,72	1,29	1,50	1,77
9. Brighton	45-9	2,21	1,42	1,95	1,92	1,35	1,33	2,08	1,26	1,81	0,95	3,02	1,95	1,45	1,03	1,55	1,85	1,00	1,22	2,24
10. Leeds	3,47	3,59	2,42	3,03	3,16	2,70	1,92	3,37	2,27	2,59	2,28	2,29	1,41	2,77	1,27	2,49	2,03	2,16	2,64	1,75
11. Cardiff	17-7	..	..	..	..	..	..	..	..	..	..	1,85	1,37	2,51	3,61	1,89	1,74	1,91	1,38	1,61
(K.) Ten Provincial towns 29-45	..	..	..	..	..	..	..	..	..	..	..	2,344	1,922	2,804	1,957	2,296	2,481	1,655	2,302	2,136
(B.) Group I. as a whole - 40-04	..	..	..	..	..	..	..	..	..	..	..	2,356	1,783	2,518	2,000	2,239	2,406	1,776	1,877	2,196
(C.) Group II. as a whole	2,372	2,741	1,866	2,206	2,586	2,193	1,379	2,255	1,316	2,996	1,292	2,510	1,137	2,733	1,449	2,364	2,45	1,484	2,136	1,884
12. Bradford	2,53	3,37	2,08	2,74	2,37	2,48	1,45	2,25	1,25	2,54	1,11	2,94	1,09	2,14	1,21	1,72	2,44	1,46	2,50	2,17
13. Norwich	1,18	2,22	1,32	1,49	2,27	1,69	1,35	2,97	1,43	3,06	0,74	2,25	0,80	2,53	0,88	2,75	2,81	1,39	1,42	2,27
14. Nottingham	2,26	1,78	2,00	1,92	2,35	2,14	1,27	1,90	1,32	3,42	1,72	1,34	1,34	3,30	1,97	2,86	2,33	1,56	2,16	1,33
(D.) Seven towns GROUP III.																				
15. Sunderland	3,501	2,989	3,045	3,130	2,880	2,701	2,205	2,965	1,769	3,283	1,675	2,687	1,966	2,642	2,544	2,408	2,997	1,667	2,573	1,992
16. Portsmouth	2,62	2,42	2,38	2,36	2,77	2,24	1,34	2,78	1,01	3,17	1,19	3,51	1,04	2,91	4,02	3,16	3,75	0,89	1,62	1,62
17. Newcastle	1,85	1,53	1,20	2,31	1,75	2,30	1,75	2,30	0,55	2,02	1,14	2,38	1,14	2,08	1,25	3,48	1,41	1,13	1,40	0,94
18. Salford	5,74	1,93	2,57	2,66	2,30	1,69	1,61	2,87	1,68	2,10	1,73	1,86	1,73	1,63	3,11	2,42	3,75	0,82	2,25	1,17
19. Manchester	34-4	4,18	4,05	3,90	3,79	3,79	2,50	3,69	2,14	3,60	1,98	3,08	2,52	3,24	2,99	3,01	3,75	2,84	3,20	2,68
20. Oldham	4,27	3,80	3,60	4,05	2,98	3,47	2,56	2,64	2,34	3,17	1,76	3,03	2,52	3,02	2,51	3,20	3,68	1,96	2,89	2,57
21. Leicester	21-0	2,97	1,49	2,97	2,07	1,79	1,62	2,41	0,86	2,22	1,01	2,03	1,05	3,07	2,61	3,22	2,80	1,03	2,55	1,93
22. Bolton	38-5	3,77	4,30	3,13	4,10	3,11	2,52	3,67	1,74	4,73	2,57	2,42	1,74	3,14	2,19	2,44	2,90	2,26	3,04	1,82
23. Blackburn	13-2	..	..	..	..	..	..	..	..	..	..	3,72	1,83	3,82	3,64	3,41	2,54	1,00	3,03	1,88
24. Derby	29-2	..	..	..	..	..	..	..	..	..	..	3,57	1,45	2,35	2,16	3,70	2,71	2,29	3,55	1,58
25. Preston	25-9	..	..	..	..	..	..	..	..	..	..	1,57	1,13	3,77	1,31	1,39	2,23	1,16	1,05	2,40
26. Huddersfield	27-2	..	..	..	..	..	..	..	..	..	..	3,24	2,81	3,77	2,95	4,73	2,47	1,81	3,55	3,59
27. Huddersfield	21-2	..	..	..	..	..	..	..	..	..	..	1,36	1,36	1,49	1,15	1,01	2,47	0,94	1,51	2,71
28. Huddersfield	21-2	..	..	..	..	..	..	..	..	..	..	2,11	1,25	1,47	1,88	1,60	2,04	0,74	1,17	2,16
(E.) Seven added towns - 17-53	..	..	..	..	..	..	..	..	..	..	..	0,85	1,46	1,66	0,43	1,88	0,51	0,71	0,71	0,71
(F.) Group III. as a whole 26-95	..	..	..	..	..	..	..	..	..	..	..	2,735	1,531	2,552	1,702	2,651	2,274	1,443	2,869	2,119
(G.) Group III. as a whole 26-95	..	..	..	..	..	..	..	..	..	..	..	2,703	1,811	2,611	2,243	2,493	2,743	1,588	2,677	2,35
(H.) Twenty-eight towns 34-34	..	..	..	..	..	..	..	..	..	..	..	2,441	1,754	2,549	2,021	2,301	2,483	1,718	2,067	2,142



TABLE giving for the LARGE TOWNS OF ENGLAND the DEATH RATES from SMALL POX in each of the Twenty Years 1871-90, together with several Group Averages for each Year. Group I.—Towns under *No System* of Infectious Diseases (Notification) Act of 1889. Group II.—Towns under the *Single or Householder System*. Group III.—Towns which by local Acts have gradually come under the *Dual System* of Notification. The towns concerning which the Registrar-General gives imperfect Data are recessed, as also are the Group Averages including them. The black mark (†) indicates the time at which the particular system of Notification came into force in the several towns of Groups II. and III.

Large Towns and Number of Persons to an Acre in 1881.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.
(G.) Twenty towns	2·068	0·842	0·076	0·129	0·062	0·243	0·430	0·198	0·062	0·065	0·325	0·085	0·053	0·159	0·132	0·008	0·039	0·065	0·001	0·001
GROUP I.																				
(A.) Towns 1-10	2·102	0·730	0·076	0·148	0·068	0·207	0·508	0·249	0·079	0·081	0·405	0·085	0·049	0·185	0·159	0·009	0·048	0·076	0·001	0·001
1. London	2·40	0·54	0·03	0·02	0·02	0·21	0·71	0·40	0·13	0·13	0·62	0·11	0·03	0·22	0·23	0·01	0·04	0·00	0·00	0·00
(1.) Nine Provincial towns - 30·34	1·564	1·067	0·149	0·376	0·149	0·206	0·158	0·005	0·000	0·003	0·026	0·037	0·074	0·103	0·039	0·017	0·131	0·206	0·001	0·002
2. Bristol	0·24	1·13	0·03	0·01	0·37	0·12	—	—	—	0·01	—	0·05	0·00	0·00	0·05	0·03	0·06	0·12	—	—
3. Wolverhampton	46·6	2·60	0·03	0·01	—	—	0·02	0·01	0·00	0·01	0·01	0·04	0·28	0·15	0·03	—	0·00	—	—	—
4. Birmingham	47·9	0·85	0·34	1·77	0·48	0·74	0·57	0·01	0·00	0·00	0·06	0·01	0·25	0·19	0·09	0·06	0·00	0·00	—	—
5. Liverpool	106·3	0·10	0·02	0·06	0·06	0·00	—	—	—	0·00	—	0·01	0·11	0·03	—	—	0·91	1·31	—	—
6. Sheffield	14·5	1·68	2·45	0·02	0·00	—	0·01	0·01	—	—	0·03	0·09	0·04	0·10	0·05	—	0·01	0·09	—	0·01
7. Hull	42·7	1·73	0·20	0·02	0·01	—	0·01	—	—	—	0·03	0·00	0·00	0·00	0·00	—	—	—	—	0·01
8. Plymouth	53·0	0·47	3·02	0·03	0·01	—	0·01	—	—	—	0·08	0·04	0·00	0·01	0·01	—	—	—	—	—
9. Brighton	8·5	3·02	—	0·01	—	—	0·10	—	—	—	0·01	0·10	0·03	0·00	0·01	0·00	0·00	0·05	—	—
10. Leeds	45·9	0·71	0·04	0·01	0·07	0·01	0·01	—	—	—	0·01	0·01	0·01	0·08	0·02	0·00	0·10	0·03	—	—
11. Cardiff	17·7	1·01	—	—	—	—	—	—	—	—	0·01	0·01	0·01	0·00	0·01	0·00	0·00	0·00	—	—
(K.) Ten Provincial Towns 29·45	—	—	—	—	—	—	—	—	—	—	—	0·036	0·071	0·102	0·038	0·016	0·129	0·198	0·001	0·002
(B.) Group I. as a whole - 40·04	—	—	—	—	—	—	—	—	—	—	—	0·084	0·048	0·184	0·156	0·009	0·049	0·074	0·000	0·001
GROUP II.																				
(C.) Group II. as a whole - 18·66	1·251	1·712	0·066	0·178	0·009	0·009	0·011	0·007	0·002	0·002	0·015	0·114	0·004	0·000	0·009	0·004	—	0·027	0·002	—
12. Bradford	0·63	0·21	0·13	0·38	0·02	0·01	0·02	0·01	—	0·01	0·01	0·01	0·00	0·00	0·01	—	—	0·01	0·00	—
13. Norwich	3·04	3·91	0·01	—	—	—	—	0·02	0·01	—	0·02	0·27	0·01	0·00	0·00	0·01	—	0·06	—	—
14. Nottingham	1·64	2·25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
GROUP III.																				
(D.) Seven towns	2·146	1·140	0·078	0·016	0·049	0·512	0·156	0·003	0·001	0·002	0·024	0·073	0·097	0·086	0·045	0·002	0·008	0·029	0·002	—
15. Sunderland	42·3	0·51	0·01	—	—	—	—	0·01	—	—	—	0·01	0·41	0·03	0·14	—	—	0·01	—	—
16. Portsmouth	28·6	0·31	0·41	0·02	—	0·01	0·01	0·01	—	—	0·06	0·38	0·30	0·08	0·02	0·01	0·02	—	0·01	—
17. Newcastle	27·1	1·03	0·03	—	—	0·01	0·01	0·01	—	—	0·04	0·03	0·00	0·00	0·00	—	—	—	—	—
18. Salford	31·4	0·31	0·03	0·03	0·23	2·32	0·52	0·01	—	0·01	0·03	0·03	0·00	0·01	0·10	0·00	0·01	0·06	0·00	—
19. Manchester	73·5	0·76	0·21	0·03	0·03	0·55	0·15	0·00	0·00	0·01	0·08	0·04	0·02	0·00	0·00	—	—	0·11	—	—
20. Oldham	24·0	0·43	0·01	0·01	0·03	0·07	0·21	0·01	—	—	—	0·00	0·00	0·00	0·00	—	—	—	—	—
21. Leicester	38·5	3·19	0·02	—	—	—	0·01	—	—	—	—	0·18	0·00	0·00	0·00	—	—	—	—	—
22. Bolton	56·5	—	—	—	—	—	—	—	—	—	—	0·00	0·00	0·00	0·01	0·02	0·03	0·09	—	—
23. Blackburn	13·2	—	—	—	—	—	—	—	—	—	—	0·00	0·00	0·00	0·00	—	—	—	—	—
24. Derby	22·9	—	—	—	—	—	—	—	—	—	—	0·02	0·00	0·00	0·00	—	—	0·01	—	—
25. Preston	25·2	—	—	—	—	—	—	—	—	—	—	0·02	0·00	0·00	0·00	—	—	0·50	—	—
26. Huddersfield	8·2	—	—	—	—	—	—	—	—	—	—	0·00	0·00	0·00	0·00	—	—	0·02	—	—
27. Birkenhead	21·3	—	—	—	—	—	—	—	—	—	—	0·00	0·00	0·00	0·00	0·02	—	—	—	—
28. Halifax	22·8	—	—	—	—	—	—	—	—	—	—	0·00	0·00	0·00	0·01	—	—	0·01	—	—
(E.) Seven added towns - 17·53	—	—	—	—	—	—	—	—	—	—	—	0·038	0·002	0·020	0·007	0·006	0·007	0·099	—	0·003
(F.) Group III. as a whole 26·95	—	—	—	—	—	—	—	—	—	—	—	0·060	0·062	0·063	0·031	0·003	0·008	0·053	0·001	0·001
(H.) Twenty-eight towns 34·34	—	—	—	—	—	—	—	—	—	—	—	0·080	0·049	0·147	0·118	0·008	0·037	0·067	0·001	0·001



TABLE VI.—DEATH RATES.—SCARLET FEVER.

TABLE giving for the LARGE TOWNS OF ENGLAND the DEATH RATES from SCARLET FEVER in each of the Twenty Years 1871-90, together with several Group Averages for each Year. Group I.—Towns under *No System* of Notification until after the passing of the Infectious Diseases (Notification) Act of 1889. Group II.—Towns under the *Single or Householder System*. Group III.—Towns which by local Acts have gradually come under the *Dual System* of Notification.

The towns concerning which the Registrar-General gives imperfect Data are recessed, as also are the Group Averages including them.

The black mark (I) indicates the time at which the particular system of Notification came into force in the several towns of Groups II. and III.

Large Towns and Number of Persons to an Acre in 1881.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.
(G.) Twenty towns																				
GROUP I.																				
(A.) Towns 1-10	37.67	0.681	0.514	0.583	1.246	1.075	0.793	0.535	0.866	0.855	0.836	0.572	0.601	0.463	0.240	0.263	0.394	0.278	0.308	0.340
1. London	50.8	0.672	0.398	0.474	1.281	1.047	0.689	0.491	0.846	0.792	0.758	0.574	0.652	0.466	0.219	0.239	0.386	0.284	0.303	0.333
(r.) Nine Provincial towns	30.34	0.831	0.616	0.964	2.162	1.043	0.758	0.583	1.470	0.903	0.657	0.670	0.901	0.643	0.293	0.359	0.439	0.263	0.508	0.554
2. Bristol	46.6	0.944	0.712	0.921	1.771	1.298	0.852	0.523	0.459	0.45	0.894	0.36	0.16	0.18	0.11	1.00	0.20	0.20	0.13	0.18
3. Wolverhampton	22.4	0.34	1.02	1.77	0.43	0.36	0.52	0.69	0.59	0.23	0.56	0.35	0.30	0.45	0.58	0.08	0.60	0.20	0.06	0.15
4. Birmingham	106.3	0.37	1.17	1.65	2.05	0.74	0.82	0.62	2.59	0.80	0.31	0.41	0.80	0.31	0.07	0.09	0.08	0.10	0.36	0.49
5. Liverpool	47.9	0.73	0.44	1.49	3.74	0.91	1.48	0.43	1.76	1.37	0.85	0.79	0.69	0.72	0.37	0.36	0.67	0.35	0.67	1.11
6. Sheffield	14.5	1.35	0.77	0.92	2.65	1.22	1.06	0.78	2.68	1.30	0.96	0.27	0.69	1.59	0.33	0.43	0.67	0.50	0.72	0.83
7. Hull	42.7	0.53	0.28	0.92	2.65	2.07	0.42	0.22	1.14	0.32	0.41	1.07	0.44	0.24	0.22	0.25	0.33	0.21	0.06	0.12
8. Plymouth	53.0	0.41	0.15	0.61	1.40	2.07	0.19	0.67	0.51	0.19	0.05	0.07	0.00	0.16	0.06	0.12	0.09	0.08	0.13	0.11
9. Brighton	45.9	0.91	0.82	0.06	0.03	0.19	0.65	0.27	0.08	0.15	0.75	0.69	0.90	1.46	0.63	0.57	0.33	0.29	0.31	0.28
10. Leeds	17.7	0.41	0.56	2.32	2.43	0.83	1.13	0.53	0.86	0.94	0.41	0.25	2.10	1.46	0.63	0.57	0.33	0.29	0.31	0.28
11. Cardiff	14.4	..	..	..	..	..	..	..	..	..	..	0.87	0.46	1.20	0.24	0.15	0.09	0.26	0.11	0.13
(K.) Ten Provincial towns	29.45	..	..	..	..	..	..	..	..	..	..	0.677	0.885	0.669	0.291	0.351	0.423	0.264	0.490	0.533
(a.) Group I. as a whole	40.04	..	..	..	..	..	..	..	..	..	..	0.578	0.648	0.479	0.219	0.237	0.381	0.283	0.301	0.329
(c.) Group II. as a whole	18.66	0.683	0.322	0.191	1.008	1.903	0.789	0.575	0.558	0.993	1.136	0.753	0.205	0.154	0.174	0.233	0.311	0.147	0.196	0.164
12. Bradford	25.5	0.98	0.54	0.31	1.81	2.83	0.86	0.63	0.90	1.08	1.13	0.55	0.18	0.17	0.24	0.44	0.49	0.16	0.29	0.21
13. Norwich	11.8	0.33	0.22	0.06	0.02	0.41	0.70	0.94	0.13	0.38	2.16	0.73	0.03	0.04	0.09	0.15	0.38	0.17	0.06	0.05
14. Nottingham	18.9	0.33	0.06	0.11	0.52	1.60	0.74	0.13	0.42	1.02	0.73	1.83	0.31	0.19	0.15	0.07	0.11	0.12	0.16	0.16
GROUP III.																				
(D.) Seven towns	37.69	0.723	1.180	1.272	1.132	0.950	1.343	0.755	1.094	1.172	1.127	0.554	0.491	0.568	0.374	0.396	0.465	0.305	0.379	0.445
15. Sunderland	29.3	1.92	1.13	0.28	1.30	0.57	1.25	1.22	1.67	2.17	2.64	1.22	1.43	0.39	0.87	0.21	0.13	0.16	0.29	0.54
16. Portsmouth	28.6	0.26	0.04	0.03	0.30	0.39	0.69	0.32	0.13	0.08	0.06	0.19	0.31	0.13	0.07	0.07	0.12	0.08	0.08	0.12
17. Newcastle	27.1	0.30	0.83	3.54	1.92	0.56	0.37	0.49	1.59	1.98	0.94	0.34	0.55	0.10	0.47	0.26	0.22	0.14	0.16	0.14
18. Salford	24.1	0.48	0.60	0.94	1.11	1.74	1.90	0.66	0.98	1.02	1.30	0.47	0.44	0.45	0.75	0.83	0.89	0.52	0.35	0.60
19. Manchester	24.5	0.74	1.02	1.56	1.42	0.94	1.39	1.06	1.01	0.98	0.95	0.28	0.28	0.70	0.73	0.19	0.44	0.54	0.46	0.74
20. Oldham	23.4	0.42	0.12	1.35	0.79	0.73	1.14	0.49	1.98	1.08	0.94	0.77	0.59	0.19	0.27	0.17	0.27	0.84	0.53	0.19
21. Leicester	38.5	1.17	0.65	0.06	0.23	1.63	1.55	0.29	0.07	0.74	0.77	1.23	0.39	0.52	0.88	0.32	0.64	0.63	0.43	0.19
22. Bolton	36.5	..	..	..	..	..	..	..	..	..	..	..	0.20	0.06	0.14	0.07	0.14	0.03	0.04	0.24
23. Blackburn	33.2	..	..	..	..	..	..	..	..	..	..	..	0.44	0.48	0.40	0.17	0.33	0.48	0.37	0.49
24. Derby	22.9	..	..	..	..	..	..	..	..	..	..	..	0.77	0.20	0.15	0.11	0.08	0.35	0.26	0.26
25. Preston	23.2	..	..	..	..	..	..	..	..	..	..	..	0.25	0.08	0.13	0.18	0.18	0.21	0.17	0.11
26. Huddersfield	21.3	..	..	..	..	..	..	..	..	..	..	..	0.36	0.08	0.13	0.36	0.62	0.21	0.33	0.07
27. Birkenhead	21.3	..	..	..	..	..	..	..	..	..	..	..	0.20	0.06	0.31	0.36	0.95	0.27	0.36	0.14
28. Halifax	22.8	..	..	..	..	..	..	..	..	..	..	..	0.31	0.10	0.30	0.14	0.25	0.36	0.14	0.16
(E.) Seven added towns	17.53	..	..	..	..	..	..	..	..	..	..	..	0.336	0.276	0.339	0.236	0.693	0.521	0.29	0.244
(F.) Group III. as a whole	26.95	..	..	..	..	..	..	..	..	..	..	..	0.437	0.419	0.336	0.267	0.513	0.381	0.385	0.374
(H.) Twenty-eight towns	34.94	..	..	..	..	..	..	..	..	..	..	..	0.557	0.575	0.462	0.260	0.406	0.297	0.313	0.330





TABLE VIII.—DEATH RATES.—“FEVER.”

TABLE giving for the LARGE TOWNS of ENGLAND the DEATH RATES from “FEVER” (chiefly Enteric) in each of the Twenty Years 1871–90, together with several Group Averages for each Year. Group I.—Towns under *No System* of Notification until after the passing of the Infectious Diseases (Notification) Act of 1889. Group II.—Towns under the *Single or Householder System*. Group III.—Towns which by local Acts have gradually come under the *Dual System* of Notification. The towns concerning which the Registrar-General gives imperfect Data are recessed, as also are the Group Averages including them. The black mark (I) indicates the time at which the particular system of Notification came into force in the several Towns of Groups II. and III.

Large Towns and Number of Persons to an Acre in 1881.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.
(g.) Twenty Towns	37.67	0.768	0.594	0.585	0.574	0.528	0.452	0.424	0.297	0.304	0.313	0.364	0.344	0.290	0.226	0.226	0.217	0.204	0.202	0.199.
GROUP I.																				
(A) Towns 1–10	40.86	0.721	0.549	0.546	0.547	0.496	0.426	0.412	0.299	0.286	0.319	0.361	0.342	0.285	0.194	0.200	0.194	0.182	0.184	0.177
1. London	50.8	0.53	0.40	0.46	0.46	0.37	0.34	0.35	0.33	0.33	0.33	0.33	0.27	0.27	0.18	0.18	0.17	0.18	0.15	0.16
(L) Nine Provincial towns	30.34	1.046	0.801	0.696	0.712	0.720	0.500	0.523	0.305	0.374	0.330	0.487	0.487	0.318	0.228	0.246	0.244	0.191	0.254	0.209
2. Bristol	46.6	0.63	0.44	0.57	0.65	0.49	0.46	0.47	0.35	0.20	0.20	0.23	0.17	0.22	0.10	0.14	0.12	0.14	0.17	0.16
3. Wolverhampton	22.4	0.79	0.48	1.18	0.65	0.52	0.35	0.38	0.22	0.21	0.16	0.19	0.19	0.20	0.11	0.15	0.21	0.16	0.15	0.13
4. Birmingham	106.3	0.53	0.54	0.68	0.55	0.53	0.38	0.38	0.47	0.47	0.53	1.08	1.00	0.37	0.35	0.37	0.37	0.31	0.41	0.24
5. Liverpool	47.9	1.79	0.88	0.62	0.53	0.92	0.74	0.71	0.46	0.35	0.22	0.33	0.30	0.42	0.23	0.24	0.26	0.19	0.23	0.22
6. Sheffield	14.5	0.91	0.99	0.96	0.75	1.25	0.96	0.64	0.43	0.37	0.31	0.45	0.36	0.36	0.15	0.15	0.21	0.24	0.18	0.18
7. Hull	42.7	0.86	1.37	0.95	1.30	0.80	0.55	0.41	0.63	0.37	0.29	0.23	0.31	0.34	0.25	0.21	0.20	0.21	0.29	0.29
8. Plymouth	53.0	0.48	0.71	0.53	0.53	0.47	0.51	0.56	0.15	0.10	0.20	0.40	0.21	0.26	0.15	0.16	0.12	0.14	0.16	0.11
9. Brighton	45.9	0.37	0.27	0.33	0.33	0.26	0.14	0.20	0.13	0.10	0.20	0.40	0.21	0.26	0.15	0.16	0.12	0.14	0.16	0.11
10. Leeds	14.4	1.27	1.12	0.78	0.75	0.56	0.65	0.38	0.42	0.27	0.35	0.50	0.38	0.44	0.22	0.29	0.30	0.15	0.36	0.30
11. Cardiff	17.7														0.35	0.63	0.15	0.30	0.22	0.16
(K) Ten Provincial towns	29.45														0.35	0.63	0.15	0.30	0.22	0.16
(N) Group I. as a whole	40.04														0.35	0.63	0.15	0.30	0.22	0.16
GROUP II.																				
(c.) Group II. as a whole	18.66	0.886	0.820	0.784	0.593	0.578	0.413	0.368	0.259	0.344	0.230	0.258	0.287	0.319	0.364	0.273	0.253	0.260	0.272	0.233
12. Bradford	25.5	0.91	0.89	0.84	0.67	0.50	0.44	0.35	0.41	0.25	0.16	0.23	0.28	0.27	0.20	0.18	0.19	0.11	0.25	0.15
13. Norwich	11.8	0.48	0.68	0.75	0.41	0.52	0.35	0.46	0.28	0.33	0.48	0.18	0.09	0.11	0.33	0.99	0.40	0.18	0.21	0.30
14. Nottingham	18.9	0.84	0.84	0.74	0.62	0.75	0.43	0.31	0.36	0.24	0.32	0.38	0.38	0.35	0.24	0.31	0.36	0.45	0.32	0.28
GROUP III.																				
(d.) Seven Towns	37.69	0.971	0.755	0.726	0.704	0.672	0.597	0.486	0.302	0.388	0.314	0.426	0.381	0.307	0.332	0.337	0.320	0.291	0.262	0.296
15. Sunderland	23.3	2.23	1.05	0.32	0.67	0.43	0.57	0.61	0.47	0.26	0.39	0.70	0.62	0.22	0.27	0.24	0.29	0.23	0.29	0.37
16. Portsmouth	28.6	0.26	1.06	0.85	0.89	0.54	0.58	0.71	0.75	0.51	0.58	0.89	0.74	0.45	0.66	0.86	0.37	0.20	0.22	0.32
17. Newcastle	27.1	0.77	0.64	0.64	0.54	0.63	0.54	0.33	0.62	0.40	0.25	0.44	0.44	0.36	0.46	0.22	0.32	0.17	0.14	0.20
18. Salford	34.4	0.77	0.66	0.65	0.65	0.70	0.50	0.62	0.61	0.30	0.56	0.32	0.35	0.51	0.35	0.33	0.43	0.51	0.53	0.43
19. Manchester	79.5	1.05	0.71	0.82	0.62	0.77	0.49	0.40	0.42	0.22	0.24	0.35	0.25	0.23	0.21	0.33	0.32	0.34	0.26	0.31
20. Oldham	24.5	0.43	0.56	0.46	0.46	0.49	0.74	0.22	0.31	0.19	0.20	0.36	0.20	0.23	0.21	0.18	0.22	0.18	0.15	0.12
21. Leicester	38.5	0.79	0.72	0.62	0.55	0.59	0.39	0.21	0.28	0.19	0.42	0.26	0.19	0.09	0.13	0.30	0.16	0.27	0.28	0.21
22. Bolton	36.5														0.32	0.18	0.32	0.31	0.27	0.24
23. Blackburn	33.2														0.30	0.31	0.35	0.37	0.21	0.32
24. Derby	22.9														0.12	0.36	0.33	0.31	0.19	0.18
25. Preston	23.2														0.42	0.38	0.62	0.29	0.60	0.28
26. Huddersfield	23.2														0.11	0.15	0.10	0.12	0.10	0.25
27. Birmmhead	21.3														0.27	0.15	0.20	0.26	0.38	0.44
28. Halifax	22.8														0.19	0.19	0.15	0.10	0.25	0.18
(F) Seven added towns	17.53														0.208	0.280	0.303	0.277	0.287	0.279
(Z) Group III. as a whole	26.95														0.287	0.318	0.314	0.286	0.271	0.290
(H.) Twenty-eight towns	34.34														0.226	0.235	0.224	0.210	0.208	0.204



TABLE giving for the LARGE TOWNS OF ENGLAND the DEATH RATES from MEASLES in each of the Twenty Years 1871-90, together with several Group Averages for each Year. Group I.—Towns under *No System* of Notification until after the passing of the Infectious Diseases (Notification) Act of 1889. Group II.—Towns under the *Single or Householder System*. Group III.—Towns which by local Acts have gradually come under the *Dual System* of Notification.

The towns concerning which the Registrar-General gives imperfect Data are recessed, as also are the Group Averages including them.

The black mark (■) indicates the time at which the particular system of Notification came into force in the several towns of Groups II. and III.

Large Towns and Number of Persons to an Acre in 1881.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.
(g.) Twenty towns	37.67	0.559	0.478	0.587	0.536	0.383	0.578	0.532	0.411	0.588	0.489	0.550	0.655	0.539	0.615	0.728	0.517	0.821	0.495	0.681
(A.) Towns 1-10	40.86	0.556	0.491	0.579	0.529	0.361	0.573	0.578	0.405	0.632	0.436	0.651	0.588	0.568	0.612	0.679	0.536	0.733	0.526	0.698
1. London	50.8	0.44	0.51	0.66	0.48	0.42	0.49	0.43	0.32	0.51	0.31	0.63	0.58	0.59	0.57	0.74	0.52	0.73	0.539	0.77
(L.) Nine Provincial towns	30.34	0.761	0.461	0.454	0.610	0.275	0.716	0.446	0.390	0.565	0.504	0.632	0.562	0.477	0.670	0.579	0.570	0.769	0.417	0.628
2. Bristol	46.6	0.33	0.31	0.58	0.35	0.56	0.33	0.69	0.26	0.57	0.08	0.37	0.27	0.17	0.23	0.75	0.47	0.70	0.37	0.42
3. Wolverhampton	22.4	0.17	0.04	0.38	0.69	0.03	0.33	0.12	0.12	0.72	0.16	0.30	0.85	0.00	1.22	0.91	1.39	0.34	0.47	0.46
4. Birmingham	47.9	0.13	0.35	0.69	0.37	0.38	0.23	0.81	0.13	0.43	0.16	0.50	0.74	1.13	1.33	0.29	0.91	0.36	0.46	0.46
5. Liverpool	106.3	0.96	0.89	0.87	0.87	0.23	1.32	0.37	0.82	0.88	0.51	1.37	0.37	1.13	1.34	0.32	1.25	0.63	0.93	0.75
6. Sheffield	14.5	0.66	0.31	0.77	0.30	0.17	0.63	0.22	0.38	0.28	0.72	0.72	0.26	0.48	0.06	0.69	0.23	0.94	0.15	0.71
7. Hull	42.7	0.10	0.31	0.38	0.33	0.23	0.33	0.29	0.03	0.26	1.35	0.05	0.73	0.07	0.48	0.13	0.71	0.02	0.94	0.08
8. Plymouth	53.0	1.52	0.32	1.13	1.94	0.01	1.52	0.05	1.01	0.63	3.87	0.26	0.77	0.35	0.64	0.28	1.03	0.08	0.86	0.20
9. Brighton	45.9	0.23	0.51	0.06	0.61	0.02	0.57	0.02	0.22	0.26	0.20	0.19	1.36	0.50	0.69	0.31	0.69	0.63	0.03	0.41
10. Leeds	14.4	0.38	0.48	0.18	0.67	0.39	0.63	0.42	0.32	0.08	0.22	0.41	0.48	0.04	0.66	0.06	0.71	0.50	0.58	0.27
11. Cardiff	17.7	..	..	..	..	..	..	..	..	..	..	..	0.37	0.12	0.97	1.82	0.16	0.53	0.88	0.31
(K.) Ten Provincial towns	29.45	..	..	..	..	..	..	..	..	..	..	..	0.554	0.464	0.685	0.637	0.553	0.759	0.442	0.731
(B.) Group I. as a whole	40.04	0.080	0.770	0.157	0.482	0.336	0.521	0.181	0.249	0.466	0.762	0.138	0.943	0.091	0.639	0.306	0.561	0.656	0.472	0.450
GROUP II.	18.66	0.06	1.26	0.07	0.37	0.14	0.82	0.12	0.30	0.49	0.36	0.07	1.17	0.72	0.52	0.17	0.23	0.65	0.16	0.56
(c.) Group II. as a whole	18.66	0.06	1.26	0.07	0.37	0.14	0.82	0.12	0.30	0.49	0.36	0.07	1.17	0.72	0.52	0.17	0.23	0.65	0.16	0.56
12. Bradford	25.5	0.05	0.01	0.70	0.07	0.22	0.14	0.35	0.11	0.53	0.11	0.14	1.04	0.08	0.62	0.00	0.32	1.50	0.32	0.32
13. Norwich	11.8	0.01	0.70	0.10	0.07	0.22	0.14	0.35	0.11	0.53	0.11	0.14	1.04	0.08	0.62	0.00	0.32	1.50	0.32	0.32
14. Nottingham	18.9	0.18	0.62	0.35	0.20	0.76	0.34	0.15	0.27	0.41	1.45	0.18	0.70	0.07	0.74	0.59	0.86	0.27	0.57	0.40
GROUP III.	37.69	0.718	0.324	0.765	0.581	0.515	0.623	0.406	0.509	0.405	0.658	0.188	0.892	0.568	0.625	1.155	0.403	1.322	0.349	0.896
(d.) Seven towns	42.3	0.59	0.50	0.32	0.57	0.05	0.40	0.05	0.85	0.01	0.86	0.03	1.63	0.13	0.06	3.11	0.03	1.33	0.02	1.03
15. Sunderland	28.6	0.33	0.45	0.13	0.47	0.54	1.05	0.09	0.38	0.08	0.42	0.06	1.22	0.08	1.17	0.05	1.34	0.06	0.33	0.06
16. Portsmouth	27.1	0.54	0.18	0.58	0.12	0.35	0.19	0.13	0.11	0.65	0.10	0.25	1.01	1.36	0.10	2.14	0.26	1.28	0.05	0.52
17. Newcastle	34.4	1.27	0.18	1.76	0.99	0.96	0.98	0.76	0.40	0.70	0.64	0.21	0.94	0.86	0.54	0.97	0.25	1.69	0.69	1.14
18. Salford	79.5	0.87	0.32	1.01	0.63	0.64	0.64	0.64	0.49	0.40	0.58	0.34	1.04	0.75	0.58	1.12	0.23	1.88	0.34	1.39
19. Manchester	24.0	0.69	0.43	0.09	0.92	0.36	0.57	0.10	0.96	0.08	0.69	0.07	0.67	0.05	1.64	0.45	0.74	1.37	0.42	0.97
20. Oldham	38.5	0.31	0.28	0.59	0.24	0.43	0.43	0.33	0.36	0.52	1.23	0.06	1.59	0.11	0.41	0.34	0.33	0.65	0.54	0.45
21. Leicester	36.5	..	..	..	..	..	..	..	..	..	..	..	0.57	0.02	1.01	0.33	1.28	0.87	0.29	1.42
22. Bolton	32.9	..	..	..	..	..	..	..	..	..	..	..	1.73	0.03	0.99	0.01	0.06	1.01	1.78	1.15
23. Blackburn	32.9	..	..	..	..	..	..	..	..	..	..	..	0.36	0.27	0.41	0.30	0.04	1.16	0.22	0.05
24. Derby	22.2	..	..	..	..	..	..	..	..	..	..	..	1.28	0.63	0.59	0.07	0.20	1.76	0.22	0.44
25. Preston	22.2	..	..	..	..	..	..	..	..	..	..	..	0.96	0.39	0.17	0.64	0.19	1.40	0.34	0.97
26. Huddersfield	21.3	..	..	..	..	..	..	..	..	..	..	..	0.38	0.43	0.69	0.84	0.23	0.88	0.19	0.71
27. Birmmhead	21.3	..	..	..	..	..	..	..	..	..	..	..	0.17	0.03	0.72	0.00	1.12	0.18	0.14	0.89
28. Halifax	22.8	..	..	..	..	..	..	..	..	..	..	..	0.38	0.43	0.69	0.84	0.23	0.88	0.19	0.71
(E.) Seven added towns	17.53	..	..	..	..	..	..	..	..	..	..	..	0.088	0.158	0.664	0.305	1.059	0.797	0.335	1.223
(F.) Group III. as a whole	26.95	0.098	0.422	0.639	0.853	0.632	1.138	0.632	0.554	0.685	0.699	0.619	0.585	0.562	0.685	0.637	0.530	0.730	0.533	0.622
(H.) Twenty-eight towns	34.34	0.078	0.506	0.623	0.709	0.554	0.815	0.487	0.698	0.568	0.625	1.155	0.403	1.322	0.349	0.896	0.477	1.03	0.16	0.63

TABLE X.—DEATH RATES.—WHOOPIING COUGH.

TABLE giving for the LARGE TOWNS OF ENGLAND the DEATH RATES from WHOOPING COUGH in each of the Twenty Years 1871-90, together with several Group Averages for each Year. Group I.—Towns under *No System* of Notification until after the passing of the Infectious Diseases (Notification) Act of 1889. Group II.—Towns under the *Single* or *Householder System*. Group III.—Towns which by local Acts have gradually come under the *Dual System* of Notification.

The towns concerning which the Registrar-General gives imperfect Data are recessed, as also are the Group Averages including them.

The black mark (†) indicates the time at which the particular system of Notification came into force in the several towns of Groups II. and III.

Large Towns and Number of Persons to an Acre in 1881.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.
(G.) Twenty towns	37·67	0·683	0·893	0·615	0·601	0·865	0·659	0·671	1·027	0·747	0·809	0·568	0·934	0·471	0·690	0·563	0·658	0·623	0·491	0·650
GROUP I.																				
(A.) Towns 1-10	40·86	0·710	0·920	0·668	0·582	0·886	0·693	0·662	1·087	0·776	0·837	0·565	1·020	0·4 7	0·740	0·620	0·690	0·641	0·467	0·711
1. London	50·8	0·70	0·98	0·55	0·52	0·94	0·78	0·49	1·24	0·82	0·93	0·51	1·21	0·40	0·80	0·63	0·71	0·74	0·42	0·77
(I.) Nine Provincial towns	30·34	0·721	0·815	0·440	0·652	0·814	0·551	0·955	0·859	0·719	0·705	0·57	0·696	0·603	0·617	0·616	0·634	0·483	0·548	0·579
2. Bristol	46·6	0·82	0·70	0·48	0·23	0·52	0·25	1·25	0·33	0·57	0·48	0·19	0·97	0·18	0·45	0·73	0·48	0·39	0·46	0·89
3. Wolverhampton	22·4	0·52	0·68	0·41	0·52	0·81	0·51	0·31	1·30	0·24	0·54	0·58	0·76	0·23	0·23	0·49	0·28	0·35	0·72	0·59
4. Birmingham	47·9	0·91	0·75	0·50	0·69	1·18	0·53	0·96	1·16	0·98	0·56	0·90	0·80	0·44	0·70	0·62	0·22	0·55	0·65	0·46
5. Liverpool	106·3	1·05	1·18	0·33	1·01	0·71	0·94	1·39	0·78	0·45	1·21	0·73	0·81	0·73	1·01	0·75	0·29	0·82	0·59	0·66
6. Sheffield	14·5	0·73	0·67	0·64	0·53	0·37	0·91	0·51	0·88	0·75	1·08	0·52	0·75	0·56	0·42	0·74	0·53	0·37	0·46	0·50
7. Hull	42·7	0·21	0·80	0·34	0·37	0·99	0·45	0·44	0·40	0·35	0·95	0·24	0·21	1·40	0·35	0·43	0·42	0·22	0·46	0·37
8. Plymouth	53·0	0·72	0·29	0·51	0·87	0·74	0·25	0·40	2·08	0·33	0·68	0·46	0·44	0·81	0·22	1·01	0·23	0·63	0·05	0·35
9. Brighton	45·9	0·09	0·27	0·45	0·53	0·82	0·11	0·53	0·31	0·51	0·37	0·31	1·12	0·55	0·32	0·40	0·60	0·27	0·43	0·87
10. Leeds	14·4	0·56	0·82	0·40	0·52	0·78	0·42	0·74	0·92	0·79	0·36	0·84	0·48	0·49	0·50	0·46	0·35	0·38	0·65	0·59
11. Cardiff	17·7	..	..	..	..	..	..	..	..	..	..	..	0·38	0·65	0·26	1·07	0·38	0·41	0·59	0·29
(K.) Ten Provincial towns	29·45	..	..	..	..	..	..	..	..	..	..	..	0·84	0·606	0·603	0·638	0·624	0·431	0·552	0·566
(B.) Group I. as a whole	40·04	..	..	..	..	..	..	..	..	..	..	1·011	0·480	0·732	0·686	0·579	0·686	0·370	0·471	0·703
GROUP II.																				
(C.) Group II. as a whole	19·66	0·498	0·502	0·476	0·334	0·834	0·318	0·491	0·809	0·364	0·592	0·429	0·425	0·347	0·438	0·559	0·306	0·715	0·723	0·354
12. Bradford	25·3	0·76	0·55	0·75	0·43	0·67	0·39	0·74	0·86	0·38	0·64	0·59	0·51	0·38	0·29	0·60	0·10	0·79	0·20	0·25
13. Norwich	11·8	0·17	0·39	0·24	0·21	1·72	0·07	0·10	1·37	0·29	0·73	0·01	0·36	0·19	0·24	0·44	0·54	0·70	0·27	0·83
14. Nottingham	18·9	0·08	0·35	0·27	0·24	0·35	0·40	0·40	0·48	0·35	0·47	0·47	0·39	0·40	0·66	0·58	0·47	0·73	0·38	0·22
GROUP III.																				
(D.) Seven towns	37·69	0·603	0·886	0·390	0·786	0·757	0·590	0·775	0·799	0·751	0·748	0·637	0·695	0·491	0·535	0·543	0·577	0·629	0·515	0·467
15. Sunderland	42·3	0·73	0·81	0·57	0·15	1·27	0·49	0·56	1·58	0·58	0·62	0·38	0·90	0·16	0·77	0·27	0·41	0·45	0·36	0·41
16. Portsmouth	28·6	0·38	0·14	0·14	0·19	0·06	0·43	0·56	0·81	0·08	0·38	0·51	0·30	0·42	0·07	0·35	0·71	0·30	0·71	0·24
17. Newcastle	27·1	0·69	0·43	0·78	0·47	0·30	0·39	0·60	0·62	0·85	0·45	0·71	0·35	0·35	0·52	0·82	0·61	0·46	0·31	0·44
18. Salford	34·4	1·31	0·37	0·95	0·99	1·05	0·57	0·70	0·72	1·03	0·90	0·84	0·56	0·69	0·69	0·69	0·83	0·85	1·16	0·44
19. Manchester	79·5	0·60	1·31	0·44	0·37	0·88	0·80	1·00	0·68	1·26	0·87	0·70	0·89	0·73	0·62	0·70	0·69	0·54	0·31	0·91
20. Oldham	24·0	0·34	0·70	0·22	1·05	0·61	0·18	1·00	0·68	0·45	0·48	0·30	0·73	0·33	0·31	0·85	0·45	0·84	0·34	0·42
21. Leicester	38·5	0·23	0·43	0·61	0·41	0·83	0·27	0·57	0·69	0·49	0·22	0·98	0·16	0·47	0·53	0·20	0·42	0·31	1·00	0·62
22. Bolton	36·5	..	..	..	..	..	..	..	..	..	..	..	0·70	0·32	0·96	0·56	0·67	0·26	0·57	0·11
23. Blackburn	13·2	..	..	..	..	..	..	..	..	..	..	..	0·54	0·39	0·02	1·30	0·21	0·81	0·63	0·06
24. Derby	22·9	..	..	..	..	..	..	..	..	..	..	..	0·34	0·39	0·23	0·48	0·49	0·37	0·39	0·19
25. Preston	25·2	..	..	..	..	..	..	..	..	..	..	..	0·81	0·31	0·33	0·53	0·65	0·40	0·27	0·64
26. Huddersfield	8·2	..	..	..	..	..	..	..	..	..	..	..	0·61	0·51	0·68	0·28	0·33	0·67	0·41	0·34
27. Birkenhead	21·3	..	..	..	..	..	..	..	..	..	..	..	1·02	0·13	0·11	0·22	0·20	0·35	0·24	0·40
28. Halifax	22·8	..	..	..	..	..	..	..	..	..	..	..	0·24	0·13	0·44	0·17	0·21	0·16	0·15	0·23
(E.) Seven added towns	17·53	..	..	..	..	..	..	..	..	..	..	..	0·620	0·337	0·406	0·667	0·402	0·441	0·454	0·467
(F.) Group III. as a whole	26·95	..	..	..	..	..	..	..	..	..	..	..	0·668	0·433	0·489	0·587	0·517	0·464	0·567	0·563
(H.) Twenty-eight towns	34·34	..	..	..	..	..	..	..	..	..	..	..	0·905	0·462	0·664	0·616	0·550	0·639	0·505	0·632



TABLE XL.—DEATH RATES.—DIARRHŒA.

TABLE giving for the LARGE TOWNS OF ENGLAND the DEATH RATES from DIARRHŒA in each of the Twenty Years 1871-90, together with several Group Averages for each Year. Group I.—Towns under *No System* of Notification until after the passing of the Infectious Diseases (Notification) Act of 1889. Group II.—Towns under the *Single* or *Householder System*. Group III.—Towns which by local Acts have gradually come under the *Dual System* of Notification.

The towns concerning which the Registrar-General gives imperfect Data are recessed, as also are the Group Averages including them.

The black mark (†) indicates the time at which the particular system of Notification came into force in the several towns of Groups II. and III.

Large Towns and Number of Persons to an Acre in 1881.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.
(A.) Twenty towns	1'600	1'397	1'413	1'256	1'269	1'223	0'925	1'323	0'564	1'401	0'793	0'831	0'766	1'242	0'693	1'195	1'030	0'619	0'858	0'818
Group I.																				
(A.) Towns 1-10	1'476	1'320	1'333	1'150	1'193	1'135	0'796	1'269	0'561	1'292	0'787	0'757	0'744	1'163	0'672	1'124	0'994	0'604	0'789	0'762
1. London	1'131	1'061	1'116	0'860	0'935	0'994	0'794	1'269	0'561	1'292	0'787	0'757	0'744	1'163	0'672	1'124	0'994	0'604	0'789	0'762
(L.) Nine Provincial towns	30'34	1'967	1'650	1'588	1'673	1'494	0'984	1'743	0'640	1'807	0'706	1'105	0'862	1'524	0'681	1'375	1'047	0'734	1'042	0'946
1. Bristol	46'6	0'86	0'75	0'84	0'66	1'12	0'87	1'32	0'35	0'94	0'43	0'32	0'46	0'68	0'66	0'49	0'54	0'33	0'57	0'43
2. Wolverhampton	22'4	1'02	1'33	1'42	1'49	1'55	0'87	1'32	0'78	1'35	0'63	1'13	0'78	1'08	0'66	1'76	1'32	0'73	0'93	0'82
3. Birmingham	47'9	1'82	2'06	1'71	2'29	1'74	1'15	1'76	0'61	1'35	0'82	1'34	0'98	1'73	0'81	1'72	1'34	0'74	1'14	0'90
4. Liverpool	106'3	2'33	1'80	1'72	1'63	1'33	1'15	1'82	0'75	1'87	0'92	1'07	0'95	1'54	0'78	1'47	1'19	0'85	1'13	0'90
5. Sheffield	14'5	2'26	1'71	1'87	1'63	1'72	1'72	1'72	0'66	2'02	0'75	1'05	0'75	1'76	0'68	1'57	0'97	0'90	1'07	1'14
6. Hull	42'0	2'22	1'77	1'70	1'97	1'70	1'49	2'87	0'48	2'43	0'50	0'75	0'75	1'73	0'42	1'37	1'11	0'37	0'68	0'73
7. Plymouth	53'0	1'38	0'95	1'22	0'93	0'56	1'35	1'12	0'46	1'26	0'45	0'39	0'46	0'61	0'46	0'72	1'01	0'37	0'50	0'58
8. Brighton	45'9	1'43	0'90	0'81	1'07	0'69	0'79	2'04	0'80	1'22	0'45	0'54	0'54	0'80	0'32	0'85	0'93	0'33	0'50	0'58
9. Leeds	14'4	2'53	1'83	1'84	2'00	1'74	0'75	2'13	0'49	2'01	1'03	1'33	0'88	1'61	0'75	1'43	1'15	0'43	0'24	0'87
10. Cardiff	17'7	..	..	..	..	..	..	..	..	..	..	1'10	0'60	1'28	0'72	1'35	0'88	0'62	0'87	0'88
(K.) Ten Provincial towns	29'45	..	..	..	..	..	..	..	..	..	..	1'105	0'851	1'516	0'684	1'379	1'087	0'731	1'019	0'948
(B.) Group I. as a whole	40'04	..	..	..	..	..	..	..	..	..	..	0'762	0'742	1'165	0'673	1'129	0'991	0'605	0'784	0'766
Group II.																				
(C.) Group II. as a whole	18'66	1'794	1'469	1'400	1'426	1'354	0'707	1'197	0'486	1'642	0'734	1'142	0'698	1'656	0'584	1'498	1'085	0'641	0'964	0'938
12. Bradford	25'3	1'71	1'37	1'44	1'56	1'27	0'59	1'70	0'39	1'53	0'45	1'26	0'39	1'33	0'44	1'09	1'00	0'65	1'02	0'88
13. Norwich	11'8	1'74	1'37	1'22	1'33	1'48	0'91	1'49	0'60	2'20	0'50	0'55	0'53	1'67	0'44	2'36	0'77	0'69	0'84	1'12
14. Nottingham	18'9	2'00	1'41	1'48	1'27	1'39	0'71	1'14	0'53	1'49	1'07	1'19	0'87	1'90	0'80	1'53	1'33	0'61	1'00	0'87
Group III.																				
(D.) Seven towns	37'69	2'180	1'891	1'763	1'608	1'489	1'023	1'656	0'613	1'877	0'850	1'099	0'906	1'483	0'845	1'427	1'198	0'689	1'161	1'046
15. Sunderland	42'3	1'30	1'11	1'64	1'44	1'35	0'78	1'76	0'60	1'71	0'78	0'89	0'76	1'28	0'64	1'72	0'97	0'50	1'48	1'05
16. Portsmouth	28'6	0'93	0'93	0'92	0'96	0'81	1'08	1'12	0'39	1'22	0'37	0'86	0'64	0'83	0'85	1'33	1'06	0'63	0'71	0'67
17. Newcastle	27'1	1'53	1'26	1'76	1'48	1'11	0'88	1'66	0'42	1'16	1'03	1'06	0'73	1'00	0'65	0'88	0'67	0'36	1'00	0'69
18. Salford	34'4	2'80	2'06	2'11	1'96	1'77	1'16	1'80	0'72	2'24	0'87	1'30	1'10	2'01	1'33	2'08	1'71	0'99	1'74	1'25
19. Manchester	79'5	2'79	2'16	1'92	1'49	1'63	0'92	1'51	0'68	1'72	0'72	1'10	1'04	1'42	0'69	1'28	1'26	0'78	1'07	1'19
20. Oldham	24'0	1'16	1'18	0'99	1'10	1'04	0'52	0'77	0'33	1'05	0'63	0'64	0'67	1'11	0'32	1'04	0'69	0'31	0'57	0'59
21. Leicester	38'5	3'23	3'12	2'47	2'84	2'49	1'63	2'62	0'75	3'27	1'54	1'68	1'16	2'50	1'46	1'91	1'83	1'08	1'60	1'51
22. Bolton	36'5	..	..	..	..	..	..	..	..	..	..	1'45	1'49	1'85	0'75	1'49	1'40	1'04	1'05	1'11
23. Blackburn	13'2	..	..	..	..	..	..	..	..	..	..	1'30	1'12	1'94	0'86	1'43	1'09	0'65	1'16	1'26
24. Derby	32'9	..	..	..	..	..	..	..	..	..	..	0'37	0'48	0'94	0'53	0'85	0'72	0'34	0'86	0'48
25. Preston	25'2	..	..	..	..	..	..	..	..	..	..	2'48	2'57	1'93	2'04	2'25	2'52	1'52	2'27	2'51
26. Huddersfield	8'2	..	..	..	..	..	..	..	..	..	..	0'64	0'46	0'64	0'23	0'49	0'40	0'19	0'38	0'37
27. Birkenhead	21'3	..	..	..	..	..	..	..	..	..	..	0'71	0'48	0'64	0'32	1'18	0'41	0'70	0'80	0'87
28. Halifax	22'8	..	..	..	..	..	..	..	..	..	..	0'54	0'30	0'50	0'26	0'55	0'27	0'18	0'24	0'21
(E.) Seven added towns	17'53	..	..	..	..	..	..	..	..	..	..	1'126	1'048	1'483	0'731	1'191	1'036	0'653	0'995	1'031
(F.) Group III. as a whole	26'95	..	..	..	..	..	..	..	..	..	..	1'108	0'957	1'484	0'804	1'345	1'142	0'676	1'103	1'041
(H.) Twenty-eight towns	34'34	..	..	..	..	..	..	..	..	..	..	0'857	0'785	1'261	0'696	1'196	1'030	0'622	0'865	0'836



TABLE XII., PART I.—COMPARISON OF FOUR QUINQUENNIA.

TABLE giving for the LARGE TOWNS OF ENGLAND, and for the specified Groups, the MEAN DEATH RATE in each of four Quinquennia, 1871-75, 1876-80, 1881-85, 1886-90.

PART I.—GENERAL, TOTAL ZYMOTIC, NOTIFIABLE ZYMOTIC, NON-NOTIFIABLE ZYMOTIC.

Large Towns, with their Population and Number of Persons to an Acre in 1881.	General.				Total Zymotic.				Notifiable Zymotic.				Non-notifiable Zymotic.			
	1871-75.	1876-80.	1881-85.	1886-90.	1871-75.	1876-80.	1881-85.	1886-90.	1871-75.	1876-80.	1881-85.	1886-90.	1871-75.	1876-80.	1881-85.	1886-90.
(g.) Twenty towns, 7,510,317	24.81	23.26	21.84	21.19	4.794	3.838	3.270	2.913	2.167	1.469	1.134	0.777	2.626	2.369	2.137	2.136
GROUP I.																
(A.) Towns 1-10, 6,001,693	24.19	22.89	21.54	20.73	4.630	3.778	3.295	2.861	2.080	1.426	1.166	0.757	2.550	2.352	2.129	2.103
1. London, 3,331,710	23.0	22.4	20.9	20.0	4.07	3.63	3.23	2.76	1.73	1.40	1.15	0.71	2.35	2.23	2.08	2.05
(1.) Nine Provincial towns, 2,172,074	26.59	24.18	22.67	22.00	5.626	4.115	3.400	3.034	2.693	1.506	1.185	0.846	2.610	2.415	2.215	2.189
2. Bristol, 209,522	23.9	22.2	19.2	19.5	3.43	3.49	2.93	2.61	2.21	1.74	1.46	0.61	1.69	1.54	1.43	1.34
3. Wolverhampton, 75,063	25.6	23.3	21.8	21.6	5.18	3.49	2.58	2.61	2.95	1.39	0.73	0.42	2.23	2.01	1.85	1.79
4. Birmingham, 402,314	25.3	23.1	21.0	20.6	5.95	4.10	3.10	2.89	3.80	1.46	0.85	0.50	3.26	2.64	2.25	2.39
5. Liverpool, 423,314	26.8	27.4	26.8	25.8	6.78	5.09	4.46	3.75	3.80	1.96	1.46	1.17	3.48	3.12	3.00	2.59
6. Sheffield, 283,610	26.9	24.3	21.9	22.2	6.19	4.55	3.32	3.39	3.25	2.06	1.39	0.89	2.94	2.70	2.19	1.77
7. Hull, 155,222	25.2	22.8	21.5	18.4	3.68	3.80	3.21	2.50	1.97	1.01	0.47	0.32	2.71	2.81	1.88	1.77
8. Plymouth, 74,025	25.2	23.6	20.7	22.2	4.19	4.07	1.99	2.97	1.07	0.61	0.76	0.42	1.88	1.57	1.63	1.57
9. Brighton, 109,053	21.8	23.6	19.3	17.6	2.86	2.18	2.39	1.99	0.98	0.61	0.76	0.42	1.88	1.57	1.63	1.57
10. Leeds, 310,481	27.8	23.9	22.4	21.7	5.76	3.84	3.51	2.91	2.63	1.26	1.51	0.70	3.13	2.59	2.00	2.21
11. Cardiff, 95,661	17.7	17.7	17.7	18.3	1.77	1.77	1.77	2.28	1.77	1.77	1.77	0.58	1.77	1.77	1.77	1.71
(K.) Group I as a whole, 2,268,638	29.45	29.45	29.45	21.91	29.45	29.45	29.45	3.009	29.45	29.45	29.45	0.835	29.45	29.45	29.45	2.174
(B.) Group I as a whole, 6,100,357	40.04	40.04	40.04	20.72	40.04	40.04	40.04	2.854	40.04	40.04	40.04	0.755	40.04	40.04	40.04	2.069
GROUP II.																
(c.) Group II as a whole, 460,036	18.66	18.66	18.66	20.64	18.66	18.66	18.66	2.631	18.66	18.66	18.66	0.899	18.66	18.66	18.66	2.065
12. Bradford, 184,035	20.7	23.7	20.6	21.4	4.89	3.36	2.30	2.59	2.28	1.36	0.60	0.54	2.62	1.99	1.70	2.06
13. Norwich, 88,037	24.3	22.6	20.0	19.9	4.47	3.44	2.04	2.76	2.28	1.36	0.60	0.63	2.19	2.10	1.44	2.13
14. Nottingham, 187,964	24.6	21.8	22.9	20.3	4.24	2.98	3.46	2.60	2.17	0.97	1.33	0.56	2.07	2.01	2.12	2.05
GROUP III.																
(d.) Seven towns, 1,145,488	37.69	27.81	25.45	23.72	5.700	4.372	3.363	3.285	2.591	1.787	1.060	0.957	3.118	2.585	2.303	2.327
15. Sunderland, 177,048	42.3	30.4	28.5	24.0	6.48	4.73	4.00	2.74	3.97	2.34	1.63	0.64	2.51	2.39	2.37	2.10
16. Portsmouth, 128,372	28.6	20.1	19.7	18.6	4.00	3.34	3.02	2.44	2.27	1.56	1.43	0.79	1.73	1.78	1.60	1.63
17. Newcastle, 145,811	29.1	20.1	23.2	21.8	6.01	3.44	3.78	2.97	3.57	1.27	1.33	0.58	2.44	1.87	2.15	1.68
18. Salford, 177,762	34.4	24.1	23.5	25.6	6.40	5.26	3.76	4.77	2.99	2.27	1.00	1.67	4.11	3.05	2.76	3.10
19. Manchester, 341,173	70.5	30.6	26.5	27.7	8.80	4.42	3.26	3.82	2.17	1.65	0.78	1.16	3.63	2.76	2.49	2.68
20. Oldham, 112,176	24.0	22.1	23.9	23.0	4.95	3.40	3.47	2.90	2.73	1.62	0.72	0.87	2.92	1.78	1.75	2.12
21. Leicester, 123,146	20.3	23.4	21.1	20.0	5.85	4.24	3.46	2.76	2.02	1.06	0.98	0.70	3.83	3.15	2.47	2.33
22. Bolton, 87,822	38.5	28.5	25.4	23.0	6.48	4.73	4.00	2.74	3.97	2.34	1.63	0.64	2.51	2.39	2.37	2.10
23. Blackburn, 92,385	38.5	28.5	25.4	23.0	6.48	4.73	4.00	2.74	3.97	2.34	1.63	0.64	2.51	2.39	2.37	2.10
24. Derby, 79,089	38.5	28.5	25.4	23.0	6.48	4.73	4.00	2.74	3.97	2.34	1.63	0.64	2.51	2.39	2.37	2.10
25. Preston, 93,032	38.5	28.5	25.4	23.0	6.48	4.73	4.00	2.74	3.97	2.34	1.63	0.64	2.51	2.39	2.37	2.10
26. Huddersfield, 86,427	38.5	28.5	25.4	23.0	6.48	4.73	4.00	2.74	3.97	2.34	1.63	0.64	2.51	2.39	2.37	2.10
27. Birkhead, 82,103	38.5	28.5	25.4	23.0	6.48	4.73	4.00	2.74	3.97	2.34	1.63	0.64	2.51	2.39	2.37	2.10
28. Halifax, 86,010	38.5	28.5	25.4	23.0	6.48	4.73	4.00	2.74	3.97	2.34	1.63	0.64	2.51	2.39	2.37	2.10
(E.) Seven added towns, 607,898	17.53	17.53	17.53	22.49	17.53	17.53	17.53	3.102	17.53	17.53	17.53	0.831	17.53	17.53	17.53	2.271
(F.) Group III as a whole, 1,753,316	26.95	26.95	26.95	23.27	26.95	26.95	26.95	3.220	26.95	26.95	26.95	0.913	26.95	26.95	26.95	2.307
(H.) Twenty-eight towns, 8,313,700	34.34	34.34	34.34	21.27	34.34	34.34	34.34	2.921	34.34	34.34	34.34	0.778	34.34	34.34	34.34	2.142

TABLE XII., PART II.—COMPARISON OF FOUR QUINQUENNIA.  
1881-85, 1886-90.

## PART II.—SMALL POX, SCARLET FEVER, DIPHTHERIA, "FEVER" (chiefly Enteric).

Large Towns with their Population and Number of Persons to an Acre in 1881.	Small Pox.			Scarlet Fever.			Diphtheria.			"Fever."		
	1871- 75.	1876- 80.	1881- 85.	1871- 75.	1876- 80.	1881- 85.	1871- 75.	1876- 80.	1881- 85.	1871- 75.	1876- 80.	1881- 85.
(G.) Twenty towns, 7,610,217	0.635	0.200	0.151	0.023	0.820	0.777	0.103	0.113	0.169	0.610	0.380	0.307
GROUP I.												
(A.) Towns 1-10, 6,004,093	0.625	0.225	0.177	0.027	0.774	0.715	0.109	0.119	0.179	0.572	0.367	0.300
1. London, 3,831,719	0.584	0.177	0.134	0.024	0.757	0.713	0.113	0.113	0.232	0.572	0.367	0.300
(I.) Nine Provincial towns, 2,172,974	0.681	0.074	0.056	0.071	1.123	0.874	0.114	0.101	0.103	0.795	0.455	0.364
2. Bristol, 267,522	0.38	0.03	0.01	0.04	0.73	0.69	0.07	0.04	0.08	0.75	0.40	0.20
3. Wolverhampton, 75,963	22.4	0.01	0.04	0.00	0.79	1.05	0.22	0.16	0.12	0.72	0.36	0.15
4. Birmingham, 402,314	47.9	0.72	0.10	0.00	1.20	0.97	0.44	0.22	0.11	0.35	0.31	0.18
5. Liverpool, 554,073	106.3	0.82	0.08	0.01	1.36	0.98	0.69	0.63	0.06	0.17	0.61	0.34
6. Sheffield, 285,619	14.5	0.33	0.00	0.03	1.36	1.36	0.88	0.63	0.07	0.37	0.62	0.22
7. Hull, 155,122	42.7	0.49	0.00	0.06	0.90	0.34	1.41	0.19	0.08	0.97	0.62	0.37
8. Plymouth, 73,925	53.0	0.79	0.00	0.01	0.32	0.06	0.81	0.15	0.27	0.55	0.42	0.28
9. Brighton, 107,953	45.9	0.15	0.02	0.03	0.40	0.38	0.40	0.11	0.05	0.32	0.46	0.24
10. Leeds, 310,483	14.4	0.35	0.00	0.03	1.31	0.77	0.99	0.36	0.08	0.88	0.42	0.38
11. Cardiff, 95,064	17.7	..	..	0.03	..	..	..	..	..	0.29	..	..
(K.) Ten Provincial towns, 2,268,638	29.45	..	..	0.069	..	..	..	..	..	..	..	..
(B.) Group I. as a whole, 6,100,357	40.04	..	..	0.027	..	..	..	..	..	..	..	..
GROUP II.												
(C.) Group II. as a whole, 4,000,36	18.66	0.643	0.006	0.007	0.821	0.790	0.058	0.075	0.088	0.732	0.350	0.292
12. Bradford, 184,035	25.5	1.15	0.01	0.00	1.20	0.90	0.32	0.07	0.05	0.76	0.35	0.23
13. Norwich, 86,937	11.8	1.39	0.01	0.00	0.25	0.86	0.19	0.07	0.07	0.57	0.38	0.25
14. Nottingham, 187,964	18.9	0.78	0.00	0.01	0.52	0.62	0.12	0.03	0.14	0.84	0.33	0.34
GROUP III.												
(D.) Seven towns, 1,145,488	37.69	0.686	0.135	0.008	1.052	1.098	0.086	0.097	0.146	0.766	0.456	0.352
15. Sunderland, 117,048	42.3	1.83	0.00	0.25	1.04	1.79	0.84	0.27	0.12	0.98	0.46	0.28
16. Portsmouth, 128,372	28.6	1.04	0.00	0.01	0.22	0.86	0.15	0.15	0.07	0.86	0.63	0.61
17. Newcastle, 145,811	27.1	1.29	0.00	0.19	1.43	1.07	0.62	0.18	0.06	0.76	0.43	0.44
18. Salford, 177,762	34.4	0.48	0.57	0.01	0.97	1.03	0.40	0.75	0.10	0.48	0.52	0.39
19. Manchester, 341,173	79.5	0.22	0.14	0.03	1.14	1.00	0.42	0.55	0.05	0.29	0.73	0.41
20. Oldham, 112,176	24.0	0.20	0.03	0.02	1.88	1.13	0.38	0.45	0.08	0.57	0.33	0.24
21. Leicester, 121,146	38.5	0.68	0.00	0.00	0.63	0.68	0.13	0.08	0.10	0.65	0.30	0.19
22. Bolton, 82,822	36.5	..	..	0.00	..	..	0.40	..	..	..	..	..
23. Blackburn, 92,385	13.2	..	..	0.03	..	..	0.91	..	..	..	..	..
24. Derby, 79,009	22.9	..	..	0.00	..	..	0.15	..	..	..	..	..
25. Preston, 93,932	25.2	..	..	0.10	..	..	0.28	..	..	..	..	..
26. Huddersfield, 86,427	8.2	..	..	0.01	..	..	0.27	..	..	..	..	..
27. Birkenhead, 82,163	21.2	..	..	0.00	..	..	0.41	..	..	..	..	..
28. Halifax, 80,010	25.3	..	..	0.00	..	..	0.23	..	..	..	..	..
(E.) Seven added towns, 667,828	17.53	..	..	0.023	..	..	0.400	..	..	..	..	..
(F.) Group III. as a whole, 1,753,316	26.95	..	..	0.013	..	..	0.399	..	..	..	..	..
(N.) Twenty-eight towns, 8,313,709	34.34	..	..	0.023	..	..	0.321	..	..	..	..	..



TABLE XII., PART III.—COMPARISON OF FOUR QUINQUENNIA.  
TABLE giving for the LARGE TOWNS of ENGLAND, and for the specified Groups, the MEAN DEATH RATES in each of four Quinquennia, 1871-75, 1876-80, 1881-85, 1886-90.

PART III.—MEASLES, WHOOPING COUGH, DIARRHEA.

Large Towns, with their Population and Number of Persons to an Acre in 1881.	Measles.			Whooping Cough.			Diarrhea.		
	1871-75.	1876-80.	1881-85.	1886-90.	1871-75.	1876-80.	1881-85.	1876-80.	1886-90.
(c.) Twenty towns, 7,610,217	0.509	0.520	0.617	0.635	0.731	0.783	0.654	0.597	1.387
GROUP I.									
(A.) Towns 1-10, 6,004,693	0.503	0.525	0.620	0.631	0.753	0.811	0.684	0.618	1.294
1. London, 3,831,719	0.50	0.53	0.63	0.63	0.78	0.85	0.71	0.57	1.15
(r.) Nine Provincial towns, 2,172,974	0.512	0.524	0.584	0.627	0.688	0.736	0.638	0.521	1.733
1. Bristol, 297,522	0.43	0.41	0.40	0.53	0.45	0.64	0.50	0.52	0.81
2. Birmingham, 422,314	0.26	0.31	0.42	0.62	0.65	0.58	0.46	0.56	1.32
3. Wolverhampton, 15,963	0.48	0.37	0.43	0.63	0.81	0.84	0.69	0.46	1.38
4. Birkenhead, 42,314	0.74	0.78	1.14	0.87	0.86	0.95	0.81	0.61	1.89
5. Liverpool, 554,073	0.44	0.38	0.44	0.55	0.66	0.75	0.61	0.85	1.36
6. Sheffield, 285,619	0.35	0.43	0.28	0.38	0.54	0.57	0.48	0.40	1.12
7. Hull, 155,123	0.78	1.42	0.46	0.57	0.63	0.75	0.59	0.89	1.79
8. Plymouth, 73,925	0.29	0.25	0.49	0.34	0.43	0.47	0.54	0.85	1.16
9. Brighton, 107,953	0.42	0.45	0.33	0.61	0.62	0.65	0.55	0.46	2.10
10. Leeds, 319,483	0.22	0.45	0.33	0.61	0.62	0.65	0.55	0.46	2.10
11. Cardiff, 95,664	17.7	..	..	0.47	..	..	..	..	..
(K.) Ten Provincial towns, 2,268,638	..	..	..	0.621	..	..	..	..	..
(N.) Group I as a whole, 6,100,357	40.04	..	..	0.628	..	..	..	..	..
GROUP II.									
(c.) Group II as a whole, 400,936	0.365	0.436	0.421	0.546	0.527	0.515	0.440	0.494	1.464
12. Bradford, 154,635	0.48	0.42	0.41	0.68	0.63	0.60	0.47	0.45	1.51
13. Norwich, 88,037	0.22	0.25	0.38	0.43	0.65	0.51	0.35	0.55	1.33
14. Nottingham, 187,964	0.30	0.53	0.46	0.47	0.26	0.43	0.50	0.50	1.51
GROUP III.									
(D.) Seven towns, 1,145,488	0.581	0.520	0.686	0.689	0.684	0.733	0.580	0.533	1.844
15. Sunderland, 179,048	0.41	0.43	0.39	0.51	0.71	0.73	0.50	0.44	1.40
16. Portsmouth, 128,372	28.6	0.38	0.52	0.36	0.35	0.45	0.33	0.40	0.98
17. Newcastle, 145,811	27.1	0.35	0.24	0.43	0.54	0.59	0.47	0.55	1.05
18. Salford, 177,762	34.4	1.63	0.70	0.86	0.90	0.91	0.74	0.68	2.18
19. Manchester, 341,173	79.5	0.55	0.77	0.96	0.83	0.80	0.73	0.58	2.10
20. Oldham, 112,176	0.50	0.48	0.58	0.84	0.38	0.56	0.50	0.64	1.13
21. Leicester, 123,146	0.37	0.57	0.30	0.43	0.50	0.45	0.51	0.31	2.95
22. Bolton, 87,823	..	..	..	0.94	..	..	..	0.60	..
23. Blackburn, 92,385	..	..	..	1.15	..	..	..	0.50	..
24. Derby, 79,089	..	..	..	0.55	..	..	..	0.44	..
25. Preston, 93,932	..	..	..	1.11	..	..	..	0.70	..
26. Huddersfield, 86,427	..	..	..	0.59	..	..	..	0.39	..
27. Birkenhead, 82,163	..	..	..	0.59	..	..	..	0.44	..
28. Halifax, 86,070	..	..	..	0.53	..	..	..	0.22	..
(E.) Seven added towns, 607,828	..	..	..	0.807	..	..	..	0.483	..
(F.) Group III as a whole, 1,753,316	17.53	..	..	0.736	..	..	..	0.516	..
GROUP III as a whole, 1,753,316	26.95	..	..	..	..	..	..	0.527	..



Mean Death Rates, General, Total Zymotic, Notifiable Zymotic, Non-notifiable Zymotic, and Zymotic further differentiated into its Seven Principal Elements.

N.B.—At the beginning of the first period of Four Years, Five of the Fourteen Towns of Group III, were as yet under no System of Notification, but the whole Group was under the Dual System from beginning to end of the Second Four Years.

Large Towns and Number of Persons to an Acre in 1881.	All Causes.		Total Zymotic.		Notifiable Zymotic.		Non-Notifiable Zymotic.		Small-pox.		Scarlet Fever.		Diphtheria.		"Fever."		Measles.		Whooping Cough.		Diarrhoea.		
	1882-85.	1886-89.	1882-85.	1886-89.	1882-85.	1886-89.	1882-85.	1886-89.	1882-85.	1886-89.	1882-85.	1886-89.	1882-85.	1886-89.	1882-85.	1886-89.	1882-85.	1886-89.	1882-85.	1886-89.	1882-85.	1886-89.	
(g.) Twenty Towns	37-67	21-88	20-75	3-249	2-901	1-056	0-769	2-193	2-133	0-107	0-028	0-469	0-311	0-175	0-218	0-306	0-212	0-634	0-623	0-675	0-584	0-883	0-926
(GROUP I.)																							
(1.) London	50-8	21-53	20-26	3-243	2-832	1-082	0-753	2-160	2-078	0-120	0-033	0-478	0-303	0-190	0-227	0-296	0-190	0-612	0-606	0-714	0-595	0-834	0-878
(2.) Nine Provincial Towns	30-34	22-77	21-51	3-421	3-031	1-173	0-833	2-248	2-198	0-063	0-089	0-627	0-392	0-211	0-119	0-372	0-234	0-572	0-627	0-633	0-507	1-043	1-065
3. Bristol	19-3	13-7	12-3	2-79	2-23	0-49	0-74	1-49	1-50	0-01	0-05	0-20	0-44	0-08	0-10	0-18	0-14	0-36	0-58	0-48	0-54	0-49	
3. Wolverhampton	22-4	21-9	21-5	2-80	2-79	0-68	0-44	2-32	2-35	0-05	0-02	0-42	0-16	0-12	0-15	0-18	0-52	0-67	0-58	0-44	0-49	1-19	
4. Birmingham	47-9	21-2	20-1	3-20	2-86	0-89	0-44	2-32	2-42	0-13	0-00	0-45	0-16	0-12	0-14	0-19	0-15	0-46	0-60	0-64	0-58	1-22	
5. Liverpool	106-3	26-8	25-3	4-46	3-66	1-47	1-08	2-99	2-58	0-09	0-02	0-54	0-13	0-16	0-17	0-37	1-09	0-83	0-83	0-59	1-09	1-16	
6. Sheffield	14-5	22-1	21-3	3-47	3-39	1-40	1-44	2-06	2-15	0-04	0-06	1-03	0-58	0-06	0-09	0-28	0-22	0-37	0-51	0-58	0-51	1-11	
7. Hull	42-7	20-9	18-4	3-22	2-32	1-17	0-46	2-05	1-86	0-07	0-03	0-64	0-21	0-10	0-06	0-37	0-18	0-34	0-45	0-54	0-41	1-18	
8. Plymouth	53-0	21-0	20-2	2-11	3-06	0-48	1-44	1-63	1-61	0-00	—	0-07	0-03	0-13	0-22	0-28	0-30	0-51	0-54	0-62	0-38	0-51	
9. Brighton	45-9	19-4	17-2	2-45	1-84	0-65	0-44	1-81	1-42	0-02	0-01	0-33	0-11	0-10	0-19	0-20	0-13	0-57	0-29	0-60	0-38	0-64	
10. Leeds	14-4	22-7	21-4	3-68	3-05	1-72	0-72	1-94	2-33	0-04	0-01	1-18	0-38	0-13	0-05	0-39	0-28	0-31	0-69	0-48	0-45	1-14	
11. Cardiff	17-7	21-4	18-6	3-63	2-35	1-35	0-62	2-34	1-73	0-03	0-04	0-69	0-15	0-30	0-11	0-33	0-33	0-82	0-47	0-59	0-44	0-93	
(B.) Ten Provincial towns	29-45	22-75	21-45	3-440	3-009	1-183	0-825	2-257	2-184	0-062	0-086	0-631	0-382	0-120	0-118	0-371	0-239	0-585	0-621	0-633	0-505	1-039	1-057
(C.) Group I. as a whole	40-04	21-54	20-26	3-251	2-826	1-087	0-751	2-165	2-075	0-118	0-033	0-481	0-301	0-191	0-225	0-296	0-192	0-616	0-604	0-713	0-594	0-836	0-877
(GROUP II.)																							
(c.) Group II. as a whole	18-66	21-59	20-48	2-718	2-694	0-761	0-583	1-957	2-110	0-032	0-008	0-322	0-222	0-100	0-088	0-307	0-205	0-495	0-535	0-442	0-529	1-020	1-047
12. Bradford	25-5	20-9	20-3	2-38	2-60	0-54	0-57	1-85	2-03	0-01	0-00	0-24	0-35	0-05	0-05	0-24	0-18	0-50	0-59	0-45	0-50	0-91	0-94
13. Norwich	11-8	30-9	30-5	2-73	2-73	0-52	0-64	1-62	2-09	0-00	—	0-06	0-13	0-08	0-17	0-38	0-24	0-44	0-46	0-31	0-48	0-87	1-17
14. Nottingham	18-9	23-0	20-9	3-33	2-73	1-10	0-57	2-22	2-23	0-07	0-02	0-53	0-12	0-16	0-08	0-34	0-36	0-53	0-53	0-51	0-58	1-19	1-12
(GROUP III.)																							
(d.) Seven towns	37-69	23-97	23-25	3-502	3-332	1-043	0-921	2-460	2-411	0-075	0-010	0-483	0-386	0-122	0-223	0-362	0-303	0-810	0-743	0-566	0-550	1-083	1-119
15. Sunderland	42-3	24-9	21-1	4-28	2-77	1-65	0-56	2-66	1-82	0-31	0-00	0-73	0-20	0-13	0-09	0-45	0-26	1-23	0-60	0-53	0-44	0-91	1-17
16. Portsmouth	28-6	19-3	18-8	2-96	2-64	1-22	0-81	1-71	1-83	0-00	0-01	0-14	0-19	0-40	0-27	0-69	0-41	0-63	0-45	0-28	0-45	0-80	0-94
17. Newcastle	27-1	23-6	21-5	3-69	2-39	1-44	0-58	2-25	1-81	0-22	0-00	0-70	0-20	0-09	0-17	0-44	0-21	0-93	0-53	0-48	0-55	0-86	0-73
18. Salford	34-4	23-7	25-1	3-97	4-78	1-01	1-58	2-96	3-20	0-01	0-00	0-49	0-79	0-11	0-34	0-40	0-45	0-83	0-94	0-70	0-63	1-44	1-63
19. Manchester	79-5	28-8	27-0	3-50	3-77	0-83	1-09	1-67	2-98	0-04	0-02	0-46	0-30	0-07	0-26	0-26	0-31	0-87	0-96	0-71	0-63	1-06	1-10
20. Oldham	24-0	24-2	23-9	2-52	3-17	0-50	0-49	1-94	2-17	0-02	0-03	0-49	0-20	0-02	0-32	0-28	0-18	0-88	0-55	0-65	0-69	0-65	
21. Leicester	38-5	20-5	20-1	3-28	2-86	0-83	0-41	2-45	2-46	0-01	0-00	0-57	0-11	0-08	0-08	0-25	0-23	0-36	0-49	0-39	0-36	1-70	1-61
22. Bolton	36-5	22-5	22-2	3-51	3-50	0-98	0-77	2-75	2-73	0-05	0-00	0-12	0-38	0-06	0-12	0-27	0-26	0-73	0-97	0-64	0-52	1-39	1-25
23. Blackburn	13-2	21-2	18-8	3-51	4-50	0-98	1-44	2-53	3-06	0-00	0-04	0-37	0-31	0-16	0-01	0-59	0-31	0-69	1-40	0-54	0-58	1-31	1-08
24. Derby	25-3	19-4	19-4	1-94	1-98	0-66	0-53	1-28	1-45	0-01	0-01	0-31	0-59	0-30	0-11	0-22	0-50	0-52	0-37	0-37	0-39	0-58	0-69
25. Preston	25-2	26-7	27-4	4-76	5-17	1-51	1-16	3-55	4-01	0-01	0-01	0-13	0-59	0-30	0-11	0-22	0-50	0-42	0-29	0-79	0-46	2-02	
26. Huddersfield	8-2	20-8	20-6	2-31	2-12	0-35	0-64	1-56	1-48	0-00	0-01	0-14	0-32	0-05	0-17	0-12	0-54	0-73	0-53	0-39	0-49	0-37	
27. Birkhead	21-3	20-2	19-9	2-39	2-60	0-71	0-88	1-72	1-72	0-04	0-01	0-28	0-47	0-07	0-11	0-33	0-80	0-54	0-50	0-55	0-44	0-60	0-78
28. Halifax	29-8	20-6	21-1	3-57	3-63	0-69	0-52	0-88	1-11	0-01	0-00	0-31	0-22	0-06	0-12	0-32	0-17	0-58	0-25	0-25	0-22	0-40	0-31
(e.) Seven added towns	17-53	22-23	22-24	2-869	3-186	0-738	0-876	2-131	2-309	0-017	0-028	0-305	0-430	0-054	0-123	0-363	0-287	0-523	0-554	0-505	0-487	1-097	0-969
(f.) Group III. as a whole	26-95	23-35	22-89	3-277	3-280	0-934	0-906	2-342	2-375	0-054	0-016	0-420	0-408	0-098	0-188	0-362	0-297	0-710	0-781	0-544	0-528	1-088	1-067
(GROUP IV.)																							
(g.) Twenty-eight towns	34-34	21-93	20-85	3-227	2-918	1-036	0-775	2-191	2-142	0-099	0-028	0-459	0-319	0-167	0-209	0-311	0-219	0-629	0-639	0-662	0-575	0-900	0-928

TABLE XIV.—MEAN DEATH-RATES IN YEARLY DESCENDING QUINQUENNIA

TABLE giving for certain specified GROUPS OF LARGE TOWNS, the MEAN DEATH-RATES, in Yearly Descending Quinquennia,—General, Total Zymotic, Notifiable Zymotic, Non-Notifiable Zymotic, and Notifiable Zymotic further differentiated into Small-Pox, Scarlet Fever, Diphtheria, "Fever,"

	1871- 75.	1872- 76.	1873- 77.	1874- 78.	1875- 79.	1876- 80.	1877- 81.	1878- 82.	1879- 83.	1880- 84.	1881- 85.	1882- 86.	1883- 87.	1884- 88.	1885- 89.	1886- 90.
<b>GENERAL.</b>																
(A.) London and Nine Provincial Towns of Group I.	24.19	23.60	23.49	23.54	23.37	22.89	22.63	22.59	22.13	21.85	21.54	21.42	21.21	20.81	20.32	20.73
(t.) The Nine Provincial Towns	26.59	25.93	25.61	25.54	24.83	24.18	23.72	23.59	23.10	23.02	22.67	22.61	22.45	21.85	21.47	22.00
(D.) Seven Towns of Group III.	27.81	27.22	26.75	26.44	25.92	25.45	24.70	24.59	24.19	24.01	23.72	23.89	23.90	23.55	23.32	23.70
<b>TOTAL ZYMOTIC.</b>																
(A.) London and Nine Provincial Towns of Group I.	4.030	4.130	3.938	4.065	3.852	3.778	3.710	3.714	3.436	3.511	3.295	3.169	3.105	3.011	2.812	2.861
(t.) The Nine Provincial Towns	5.026	5.096	4.711	4.833	4.238	4.115	3.905	3.885	3.564	3.715	3.400	3.350	3.308	3.063	2.938	3.034
(D.) Seven Towns of Group III.	5.700	5.260	4.772	4.670	4.324	4.372	3.888	3.917	3.589	3.661	3.363	3.456	3.485	3.331	3.348	3.285
<b>NOTIFIABLE ZYMOTIC.</b>																
(A.) London and Nine Provincial Towns of Group I.	2.080	1.642	1.538	1.679	1.524	1.426	1.443	1.331	1.238	1.263	1.166	0.992	0.918	0.827	0.755	0.767
(t.) The Nine Provincial Towns	2.693	2.306	2.037	2.030	1.679	1.506	1.424	1.409	1.297	1.272	1.185	1.091	1.020	0.865	0.804	0.846
(D.) Seven Towns of Group III.	2.591	2.311	1.980	1.893	1.820	1.787	1.508	1.441	1.313	1.211	1.060	1.007	0.974	0.930	0.911	0.937
<b>NON-NOTIFIABLE ZYMOTIC.</b>																
(A.) London and Nine Provincial Towns of Group I.	2.550	2.488	2.350	2.386	2.328	2.352	2.267	2.332	2.138	2.247	2.129	2.177	2.187	2.183	2.057	2.103
(t.) The Nine Provincial Towns	2.933	2.790	2.654	2.744	2.559	2.610	2.481	2.476	2.266	2.444	2.215	2.260	2.289	2.228	2.134	2.189
(D.) Seven Towns of Group III.	3.109	2.949	2.792	2.776	2.504	2.585	2.379	2.476	2.276	2.451	2.303	2.449	2.511	2.452	2.438	2.327
<b>SMALL-POX.</b>																
(A.) London and Nine Provincial Towns of Group I.	0.625	0.246	0.201	0.236	0.222	0.225	0.264	0.180	0.140	0.161	0.177	0.097	0.090	0.095	0.053	0.027
(t.) The Nine Provincial Towns	0.661	0.389	0.208	0.179	0.104	0.074	0.038	0.014	0.028	0.049	0.056	0.054	0.073	0.099	0.079	0.071
(D.) Seven Towns of Group III.	0.686	0.359	0.162	0.147	0.144	0.135	0.037	0.021	0.039	0.055	0.065	0.061	0.048	0.034	0.017	0.008
<b>SCARLET FEVER.</b>																
(A.) London and Nine Provincial Towns of Group I.	0.774	0.778	0.796	0.871	0.773	0.715	0.706	0.722	0.684	0.618	0.511	0.430	0.392	0.319	0.286	0.309
(t.) The Nine Provincial Towns	1.123	1.109	1.102	1.203	0.951	0.874	0.883	0.900	0.787	0.735	0.662	0.573	0.527	0.399	0.372	0.425
(D.) Seven Towns of Group III.	1.052	1.175	1.090	1.055	1.063	1.098	0.940	0.888	0.769	0.648	0.497	0.466	0.460	0.422	0.384	0.398
<b>DIPHTHERIA.</b>																
(A.) London and Nine Provincial Towns of Group I.	0.109	0.106	0.114	0.120	0.119	0.119	0.127	0.144	0.153	0.166	0.179	0.189	0.198	0.202	0.219	0.234
(t.) The Nine Provincial Towns	0.114	0.104	0.099	0.101	0.099	0.100	0.100	0.098	0.092	0.095	0.103	0.116	0.121	0.120	0.121	0.121
(D.) Seven Towns of Group III.	0.086	0.086	0.089	0.097	0.089	0.097	0.131	0.145	0.142	0.143	0.146	0.124	0.130	0.157	0.202	0.250
<b>"FEVER."</b>																
(A.) London and Nine Provincial Towns of Group I.	0.272	0.513	0.485	0.459	0.409	0.367	0.346	0.336	0.321	0.319	0.300	0.276	0.243	0.211	0.191	0.187
(t.) The Nine Provincial Towns	0.795	0.704	0.648	0.606	0.524	0.455	0.403	0.396	0.390	0.393	0.364	0.347	0.298	0.245	0.223	0.229
(D.) Seven Towns of Group III.	0.766	0.691	0.637	0.593	0.513	0.456	0.399	0.387	0.362	0.363	0.332	0.357	0.355	0.317	0.308	0.301



TABLE XV.—PROPORTION OF ZYMOTIC TO TOTAL DEATHS IN 20 LARGE TOWNS AS A WHOLE DURING FOUR QUINQUENNIA.

TABLE giving for the TWENTY LARGE TOWNS or Group (G.), the actual number of Deaths from all Causes, and also from the seven principal Zymotic Diseases in each of the 20 Years 1871-90, and the Average Proportions of the several kinds to the Total Deaths in each of the four Quinquennia, and in the whole Period.

	All Causes.	Total Zymotic.	Notifiable Zymotic.	Non-notifiable Zymotic.	Small Pox.	Scarlet Fever.	Diphtheria.	Fever.	Measles.	Whooping Cough.	Diarrhoea.
1871	170,153	41,719	23,377	18,342	13,348	4,398	672	4,959	3,604	4,411	10,327
1872	-	31,529	13,369	18,160	5,521	3,374	579	3,895	3,135	3,860	9,165
1873	-	154,716	-	17,418	505	3,581	616	3,898	3,008	4,097	9,413
1874	-	26,318	8,900	16,176	870	8,416	716	3,882	3,017	4,065	8,494
1875	-	107,808	13,884	12,265	427	7,378	840	3,620	2,631	3,633	8,711
1876-75	-	29,540	12,265	17,275	427	7,378	840	3,620	2,631	3,633	8,711
1871-75	-	159,186	71,795	87,371	20,671	27,447	3,423	20,254	16,895	24,368	46,110
Proportions in the first quinquennium	1,000	193	87	106	25	33	4	25	20	30	56
1876	-	28,176	11,019	17,157	1,700	5,536	633	3,150	4,031	4,591	8,535
1877	-	163,442	-	14,366	3,041	3,792	642	2,977	3,763	4,750	5,553
1878	-	160,102	10,452	14,366	3,041	3,792	642	2,977	3,763	4,750	5,553
1879	-	175,174	11,793	20,053	1,433	6,290	989	3,081	2,086	7,458	9,009
1880	-	173,760	9,932	14,008	461	6,307	970	2,194	4,336	5,512	4,160
1876-80	-	23,940	9,932	14,008	461	6,307	970	2,194	4,336	5,512	4,160
1881	-	160,382	30,124	20,222	485	6,263	873	2,281	3,667	6,059	10,496
1882	-	138,904	53,098	85,806	7,120	28,188	4,107	13,683	18,783	28,370	38,553
Proportions in the second quinquennium	1,000	165	63	102	8	33	5	16	22	34	46
1881	-	164,854	10,962	14,514	2,463	5,017	1,106	2,376	4,179	4,312	6,023
1882	-	171,741	9,108	18,581	650	4,388	1,275	2,795	5,029	7,171	6,381
1883	-	169,445	22,829	13,760	412	4,657	1,336	2,664	4,179	3,650	5,331
1884	-	174,834	19,927	12,443	1,243	3,617	1,442	2,268	4,816	5,400	9,711
1885	-	165,731	16,007	10,444	1,895	3,617	1,378	1,780	5,755	4,778	5,474
1881-85	-	846,085	43,806	82,789	5,812	19,574	6,537	11,883	23,958	25,311	33,220
Proportions in the third quinquennium	1,000	150	52	98	7	23	8	14	28	30	40
1886	-	23,582	5,340	18,242	65	2,109	1,556	1,810	4,145	4,523	9,574
1887	-	27,089	6,766	20,323	316	3,180	1,592	1,739	6,045	5,330	8,348
1888	-	20,367	6,369	14,198	532	2,277	1,896	1,664	4,043	5,088	5,067
1889	-	165,803	6,562	16,592	7	2,552	2,338	1,665	5,444	4,037	7,091
1890	-	191,749	6,753	17,941	8	2,838	2,248	1,659	5,691	5,425	6,825
1886-90	-	119,086	31,790	87,296	928	12,965	9,340	8,537	25,968	24,423	36,905
Proportions in the fourth quinquennium	1,000	137	37	100	1	15	11	10	30	28	43
1871-90	-	543,751	200,459	343,292	34,531	88,174	23,407	54,377	85,694	102,470	155,188
Proportions in the whole period	1,000	161	59	101	10	26	7	16	25	30	46



TABLE XVI.—PROPORTION OF ZYMOTIC TO TOTAL DEATHS IN GROUPS I. AND III. DURING THE TWO PERIODS OF FOUR YEARS EACH.

TABLE giving for GROUP I. as a whole (B.), for the PROVINCIAL TOWNS of GROUP I. (K.), and for GROUP III. as a whole (F.) the Actual Number of Deaths in each Year 1882-89, the Proportion of Zymotic to Total Deaths in each of the Two Periods of Four Years 1882-85 and 1886-89, and the Proportion Per Cent. of the latter to the former, as regards the Actual Number of Deaths in each Period.

	Popula- tion.	All Causes.	Total Zymotic.	Notifiable Zymotic.	Non- notifiable Zymotic.	Small- Pox.	Scarlet Fever.	Diph- theria.	Fever.	Measles.	Whooping Cough.	Diarrhoea.
(B.) GROUP I. AS A WHOLE.												
1882	6,136,643	134,926	21,806	7,340	14,466	513	3,545	1,080	2,902	3,590	6,203	4,678
1883	6,192,445	138,633	18,680	7,627	11,053	298	4,019	1,193	2,114	3,483	2,972	4,598
1884	6,255,127	137,510	22,683	7,219	15,744	1,149	2,992	1,288	1,790	3,869	4,534	7,991
1885	6,315,719	130,130	27,435	4,888	12,637	989	1,387	1,219	1,243	4,414	3,968	4,355
1882-85	24,902,934	536,139	80,924	27,024	53,900	2,949	11,943	4,783	7,349	15,356	17,727	20,817
Proportions in first four years		100	101	50	101	5	22	9	14	29	33	39
1886	6,377,236	134,023	18,350	4,075	14,275	62	1,516	1,173	1,324	3,382	3,692	7,901
1887	6,439,638	135,050	20,754	5,234	15,500	317	2,454	1,228	1,245	3,443	4,413	6,385
1888	6,503,124	127,440	16,608	5,064	11,544	485	1,843	1,540	1,193	3,464	3,435	9,335
1889	6,567,327	127,783	17,394	5,065	12,329	3	1,973	1,870	1,213	3,464	3,091	5,149
1882-89	25,887,585	524,266	73,106	19,495	53,618	867	7,786	5,827	9,378	15,357	15,341	22,670
Proportions in second four years		100	139	37	102	2	15	11	9	30	29	43
Proportion per cent. of latter to former	104	98	90	72	100	29	65	121	68	101	87	109
(F.) GROUP III. AS A WHOLE.												
1882	1,794,052	42,485	6,721	1,871	4,850	109	783	220	759	1,602	1,199	1,989
1883	1,815,418	41,993	5,634	1,745	3,889	114	762	146	723	701	786	1,737
1884	1,837,452	43,713	6,586	1,791	4,795	115	895	139	622	1,173	895	2,724
1885	1,859,278	42,377	5,581	1,409	4,172	58	625	191	535	1,585	1,092	1,495
1882-85	7,305,990	170,568	23,922	6,816	17,106	396	3,065	716	2,639	5,186	3,975	7,945
Proportions in first four years		100	40	100	100	2	18	4	15	30	23	47
1886	1,922,296	44,860	6,281	1,490	4,791	6	684	221	609	1,215	992	2,384
1887	1,946,791	46,335	7,808	1,965	5,843	15	989	340	611	1,217	904	2,222
1888	1,971,689	42,642	4,916	1,784	3,132	105	750	364	565	679	1,119	1,334
1889	1,997,001	45,585	7,211	1,864	5,347	3	769	551	541	2,018	1,125	2,204
1882-89	7,837,777	179,422	25,716	7,103	18,613	129	3,172	1,476	2,326	6,129	4,140	8,344
Proportions in second four years		100	143	40	104	1	18	8	13	34	23	46
Proportion per cent. of latter to former	107	105	107	104	109	33	103	206	88	118	104	105
(K.) THE PROVINCIAL TOWNS OF GROUP I.												
1882	2,272,932	52,021	8,253	2,925	5,328	82	1,541	217	1,085	1,261	1,556	2,511
1883	2,296,531	53,055	7,879	3,472	4,407	164	1,642	245	1,083	1,063	1,390	1,954
1884	2,314,634	54,400	9,384	2,844	6,540	236	1,548	315	745	1,584	1,396	3,510
1885	2,336,264	50,130	6,214	1,641	4,573	630	680	323	548	1,486	1,589	1,598
1882-85	9,217,361	209,666	31,680	10,882	20,798	572	5,799	1,100	3,411	5,394	5,891	9,573
Proportions in first four years		100	151	52	99	3	28	5	16	26	28	46
1886	2,358,434	51,747	7,229	1,816	5,413	38	828	327	623	1,304	853	3,251
1887	2,381,161	52,812	8,070	2,165	5,905	308	1,007	277	573	1,808	1,485	2,612
1888	2,404,457	48,592	5,805	1,825	3,980	476	634	239	476	1,063	1,158	1,759
1889	2,428,335	52,100	7,685	2,006	5,679	2	1,189	288	617	1,775	1,342	2,472
1882-89	9,572,387	205,251	28,789	7,992	20,797	824	3,658	1,131	2,289	5,950	4,843	10,094
Proportions in second four years		100	140	39	102	4	18	6	11	29	24	43
Proportion per cent. of latter to former	104	98	91	73	100	144	63	103	67	111	83	106

TABLE XVII.—UNCERTIFIED DEATHS.

TABLE giving for the TWENTY-EIGHT LARGE TOWNS OF ENGLAND the PERCENTAGE OF UNCERTIFIED (CAUSES OF) DEATHS TO TOTAL DEATHS in each of the Nine Years 1882-90, these being the only years in which the Registrar-General gives them.

Large Towns and Number of Persons to an Acre in 1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.
(g.) Twenty towns	2.42	2.46	2.30	2.21	2.23	2.22	2.02	2.06	1.94
GROUP I.									
(A.) Towns 1-10	2.14	2.24	2.11	2.06	2.05	2.01	1.94	2.03	1.94
1. London	1.2	1.2	1.3	1.1	1.2	1.1	1.0	1.1	0.9
(I.) Nine Provincial towns	3.69	3.85	3.47	3.61	3.53	3.52	3.57	3.49	3.65
2. Bristol	2.7	3.0	2.4	2.0	2.5	2.0	2.6	2.2	2.4
3. Wolverhampton	6.5	6.8	3.8	2.6	1.8	1.5	1.5	1.5	1.2
4. Birmingham	47.9	1.4	1.5	2.1	2.3	2.1	2.6	2.4	3.0
5. Liverpool	106.3	4.7	4.9	4.8	5.1	5.0	5.0	5.6	6.1
6. Sheffield	14.5	4.6	5.2	6.1	5.5	5.9	5.5	4.6	4.9
7. Hull	42.7	5.4	5.6	5.6	4.8	4.2	4.4	4.2	3.4
8. Plymouth	53.0	0.8	1.0	0.6	0.8	1.2	1.0	0.9	0.6
9. Brighton	1.6	2.8	1.6	1.2	2.7	3.1	2.4	3.1	3.0
10. Leeds	3.5	3.1	2.0	2.4	1.6	1.7	1.5	1.6	1.0
II. Cardiff	1.9	1.9	2.2	1.8	1.8	2.2	2.1	1.8	2.1
(K.) Ten Provincial towns	3.63	3.79	3.41	3.52	3.45	3.46	3.51	3.42	3.58
(N.) Group I. as a whole	2.13	2.24	2.11	2.05	2.04	2.03	1.94	2.02	1.94
GROUP II.									
(c.) Group II. as a whole	2.75	2.79	2.20	1.76	2.13	2.15	1.76	1.75	1.64
12. Bradford	4.5	3.0	2.6	2.0	2.6	2.8	2.3	1.9	1.9
13. Norwich	2.5	3.1	1.7	1.5	1.8	1.3	1.1	1.2	1.2
14. Nottingham	1.3	2.4	2.0	1.6	1.9	1.8	1.6	1.9	1.5
GROUP III.									
(d.) Seven towns	3.63	3.39	3.24	3.08	3.08	3.11	2.48	2.29	2.06
15. Sunderland	3.9	4.3	2.9	3.3	3.3	4.4	1.9	1.3	1.2
16. Portsmouth	0.8	0.9	0.9	1.3	1.2	1.0	1.1	1.0	0.7
17. Newcastle	3.2	3.6	2.9	2.9	2.9	3.0	2.2	2.2	2.2
18. Salford	6.1	4.7	4.3	4.0	4.2	4.0	3.6	3.3	3.0
19. Manchester	79.5	2.4	2.8	2.2	2.5	2.5	2.5	2.1	2.0
20. Oldham	24.0	6.5	6.8	7.5	6.3	5.4	3.1	3.5	2.2
21. Leicester	38.5	2.8	1.9	1.9	2.2	2.4	2.1	2.5	2.2
22. Bolton	3.7	2.5	2.4	2.8	3.3	2.5	2.5	1.9	1.9
23. Blackburn	13.2	2.9	3.0	2.5	3.1	3.1	2.9	2.3	3.1
24. Derby	22.9	1.1	1.3	1.7	2.3	1.8	1.5	1.6	0.9
25. Preston	23.2	4.1	3.9	2.9	2.8	2.7	2.6	2.6	2.8
26. Huddersfield	8.2	5.1	3.7	4.5	3.9	3.6	3.4	4.8	4.4
27. Birkenhead	21.3	2.9	4.5	3.8	1.9	2.2	1.2	1.5	1.1
28. Halifax	22.8	9.6	6.0	7.0	7.7	7.0	5.4	5.6	5.5
(E.) Seven added towns	17.53	4.06	3.51	3.42	3.47	3.15	2.75	2.79	2.73
(F.) Group III. as a whole	3.63	3.62	3.33	3.20	3.21	3.13	2.57	2.46	2.28
(H.) Twenty-eight towns	2.50	2.5	2.40	2.30	2.32	2.29	2.08	2.12	2.01

## DISCUSSION.

**Dr. Edward Sergeant** (Lancashire) had had experience of notification of infectious diseases since 1877, when the Corporation of Bolton, upon his advice, instituted the system by means of a local Act of Parliament. The list of diseases scheduled was similar to that of the Notification Act of 1889, and the onus of reporting was imposed upon the householder and medical attendant. This "dual" form of notification had acted well, and the public were not unfavourable to it. In his experience the opposition had mostly come from medical practitioners, and as it had subsided it was unfortunate that these difficulties should be again raised. In Lancashire notification had now been adopted by three-fourths of the population, and the remaining fourth were considering the question. It was now admitted that no one has a right to keep from the sanitary authority the knowledge of infectious disease. He was able to state that in 10 years from the date when notification came into force in Bolton, small-pox was completely eradicated, and scarlet fever showed a reduction of 40 per cent. as compared with the preceding 10 years.

**Dr. Hewitt** (Secretary of the State Board of Health of Minnesota) said that no surprise had been greater than Mr. Biddle's paper, and the information that it represented the opinion of a class of medical men. Obligatory notification of infectious diseases was enacted into law in Minnesota in 1883, at the request of medical men and of the people alike. It was a success, and could not be abolished. He cited diphtheria as an example of the working of the law. The mortality in 1883 was 1,373, with a population of less than 700,000, while in 1890 the mortality was but 761 in a population of 1,302,000. Its prevalence—from a moderate endemic form, including a town or two, in 1883—had now assumed a family character, and it was limited usually to the household in which it first occurred. The healthy children of infected families were usually removed to households where there were no young children. There were no hospitals for infectious diseases in the country districts, but the means adopted had resulted in limiting the cases in a family to but one or two.

**Dr. Louis Parkes** (London) drew attention to the folly of including erysipelas in the Notification Act. All diseases included in an Act inflicting a penalty for disobedience to its provisions should be very strictly defined, so that no mistake could possibly arise as to what disease is being dealt with. A large number of cases of erysipelas were notified, and very little useful action (if any) was taken on the knowledge of these cases. The proportion of cases of idiopathic erysipelas (which was undoubtedly infectious) to the traumatic cases (which were only contagious to those with open wounds) was very small, and consequently a large amount of public money proportionally to the whole expense incurred was wasted in fees to medical men for information supplied, which was of no public utility. Many practitioners felt compelled to notify slight cases of inflammation following trifling wounds. They could not be certain that such cases would not be regarded as erysipelatous, and they wished to avoid the risk of incurring a penalty by not notifying.

**Mr. Shirley Murphy** (London) desired to emphasize the value of notification in giving early intimation of the existence of an outbreak of epidemic disease, and in affording opportunity for the early discovery and arrest of the cause. He referred to the difficulties he experienced before the existence of the Notification Act in connexion with a particular outbreak of enteric fever due to an infected milk-supply, when an



immensity of mischief had been done before he had any knowledge that an epidemic was in progress. He was satisfied that the Act was a safeguard to the public. Further, the Act would lead to greater knowledge of the natural history of infectious diseases, which could not fail to be of value in the future. The uses of the Act extended beyond the isolation of the sick and the improvement of houses.

**Dr. Willoughby** (London) said that opponents of notification persisted in identifying it with forcible removal, and in alleging what they always *might* know, and if they had had any case in their own family *must* know, to be false, viz., that when isolation at home was practicable, removal was not enforced. He challenged them to say yes to the question, "Would they leave alone a case of virulent scarlet fever in a tailor's workroom, or of small-pox in a washerwoman's confined lodging, each of which he had seen?" If there were such a thing as disinfection, would they protect and defend the man who, by concealing disease in his own house, caused the death of his neighbour, from the consequences of his own selfish act? He wished Mr. Biddle to explain how knowledge of the existence of disease could check measures for its suppression; and asked how those faddists, who are at once anti-notification, anti-vaccination, and anti-everything, reconciled the extremely stringent and inquisitorial policy of the Leicester Corporation, where, however, they had not dared to experiment with unvaccinated women as nurses.

**Dr. Atkinson** (Surrey) said that we were constantly being told what dual notification was going to do in the way of lessening the death-rate and finding out the natural history of infectious diseases, but what it had effected would appear to be a much more practical and important question. None of the recent important discoveries in sanitary science were due to dual notification. When he asked the advocates of the dual system what they had accomplished, and twitted them with the smallness of their gains, he was told to "possess his soul in patience—Rome was not built in a day."\* No one would be so foolish as to oppose notification, if carried out in a proper manner and at the proper time; but it could never answer to put the cart before the horse, and it would never prove to be an effectual procedure to apply dual notification in any district before every house had been inspected and its sanitary defects made good. Until this was done, a certain number of lives must continue to be sacrificed, the cursory and partial examination brought about by dual notification being incapable of producing equivalent results. The two chief medical papers were in favour of dual notification, and yet the *British Medical Journal*† admitted that the amount to be paid is sometimes larger than the authorities anticipated, while at the same time there is frequently no result to be shown for this expenditure; and the *Lancet*‡ says that the Notification Act would be more triumphantly vindicated if it could be shown to keep down the number of cases to more modest proportions. In Manchester, "with all our powers and appliances, it would seem we make but little progress in the diminution of scarlet fever, typhoid fever, and diphtheria."§ Finally, to back up these views, there was the unassailable evidence produced by Mr. Biddle.

**Dr. Covernton** (Ontario) described the notification system enforced in his province. The regulations were very stringent, but worked well, and without friction, and epidemic diseases were becoming stamped out.

\* *Sanitary Record*, March 15, 1891.

† November 13, 1890.

‡ March 22, 1890.

§ *Lancet*, February 14, 1891.

**Mr. T. Corbet, M.R.C.S.** (Kingston-on-Thames), said that State interference with the legitimate functions of a medical man, by putting him under a penal enactment to notify infectious diseases, had not lessened the death-rate from those diseases in the manner its promoters so confidently predicted. Mr. Biddle's statistics proved this conclusively. A great deal of money had already been spent on notification without any good results being shown, even in those towns where it had been longest on its trial. Some towns which had adopted the Act in haste were repenting at leisure; Kidderminster, for example, had allowed the Act to become a dead letter. He regarded the obligation to notify on the part of the medical attendant as an infringement of personal rights and liberty. It compelled him to become a State-informer on his patients. They did not advocate the liberty to do anything wrong, but the liberty to practice their profession with honour to themselves and duty to their patients.

**Dr. Vivant** (Monaco) had not thought that in England any doubt remained as to the obligatory notification by the medical attendant, but what he had heard satisfied him that the dispute was far from being at an end. In France a *projet de loi* for the same purpose was in preparation, and it had occurred to Dr. Martin and himself that it would be extremely interesting to ascertain by a vote of the Section how many of the hygienists present were in favour of the principle, and how many against it.

**Dr. Edward Berdoe** (London) stated that in Bethnal Green he experienced no friction whatever in the working of the Notification Act, except with the owners of property where diseases occurred. Poor people were now anxious to take advantage of the means of hospital isolation, whereas before notification was made compulsory the friction with this class was often most serious. He had seen, scores of times, scarlet fever patients in bed in a room where match-boxes were being made by thousands, and had seen clothing made and lying on the bed in which the fever patient lay. In the old days he had had the greatest difficulty in getting such cases removed, but now there was none. Very often the poor people found a case of diphtheria or fever a real blessing to the household, as it led to their houses being put in a sanitary condition. He accounted for the apparent increase of diphtheria by the tendency of inexperienced medical men to err on the safe side, and to notify common sore throat as diphtheria; but the certainty that diphtheria was not overlooked was ample compensation for the expense and statistical errors involved.

**Dr. Drysdale** (London) gathered from his paper that Mr. Biddle preferred to leave all contagious diseases alone, and to allow them to go on uncontrolled, either by notification or segregation. This was, in his opinion, quite an untenable position. All contagious diseases, such as typhus, scarlatina, and small-pox, were spread simply and solely by contagion, and never by so-called spontaneous generation by means of overcrowding and filth. It was difficult to cure diseases such as small-pox, but they might easily be prevented by segregation of the patient. Everybody knew that young persons often escaped scarlatina, and even measles and whooping cough, when educated at home and not exposed to infection at school. Notification was only useful if it led to segregation. He held that eventually all cases of infectious disease would be segregated in houses provided in each parish or district, where the patient



would be treated by his own medical man. He was convinced that if this were done, civilisation might free itself entirely from such plagues as small-pox, typhus, scarlatina, and even from measles and whooping cough.

**Dr. Gemmell** (Glasgow) stated that unscrupulous medical men are capable sometimes of sending in cases of infectious diseases diagnosed wrongly for the sake of the fee. Thus, measles was often sent in as scarlet fever, because no fee was given for the former, while a fee was given for the latter. This in Dr. Gemmell's experience occurred so often, and so persistently, that the practitioners in question could only be assumed to be acting for gain, or else they were unacquainted with the very elements of their profession.

The discussion was continued by Dr. Harvey Littlejohn and Dr. Guertler.

**Dr. Ewing** (New York) said that compulsory notification had been in force in New York for many years without present opposition. No fees were paid to the profession, but postal cards were provided. Expert diagnosticians visited the persons reported as having infectious diseases, and the diagnosis was confirmed before removal to hospital.

**Dr. Spottiswoode Cameron**, in replying on the discussion on his own paper, asked permission to speak at the same time to the general question. He had had practical experience for 13 years of working with notification in Huddersfield, and he had had nearly two years of working without it in Leeds. Speaking as an advocate of notification, he was glad that Mr. Biddle had presented his case. His statistics, however, were not strictly comparable. Mr. Biddle compared, for instance, towns without any fever hospital accommodation at all with others in which an attempt at isolation had been carried out for years. He also told them nothing about the varying systems of house inspection existing in these different towns. Although Dr. Cameron was an advocate for notification, if he had to make his choice between an efficient house-to-house inspection in his town, and the compulsory notification of infectious disease, he would unhesitatingly choose the former; but Mr. Biddle said nothing about the efficiency or non-efficiency of house inspection in the towns which he compared. Again, notification had become compulsory in the towns dealt with at various dates from 1876 to the present time, and the figures for towns so varying could not therefore be compared. In regard to the two towns which had had notification longest, Bolton and Huddersfield, Mr. Biddle was entirely silent as to the zymotic mortality in the prenotification period. It is true these figures for these towns are not given in the Registrar-General's reports before 1882, but they could have been had on application to the medical officers for these towns; in fact, he believed he had himself furnished Mr. Biddle with the figures relating to Huddersfield, but he had not made use of them in his paper. From a study of the figures he believed it was true, as Mr. Biddle alleged, that the mortality from the notifiable diseases had not decreased in the towns with notification at the same rate as those without, but Mr. Biddle had not pointed out that the proportionate decrease of the notifiable and non-notifiable diseases in the towns with and without notification was different. Comparing the years 1874-5-6 with the years 1886-7-8 in the large towns with notification, the notifiable diseases had decreased 58, and the non-notifiable 14 per cent., while in the large towns without notification the decrease of the notifiable had been 68 and of the non-notifiable 26 per cent. While the



decrease, therefore, in towns without notification had been rather more than twice as much in the notifiable as in the non-notifiable groups of diseases, in the towns with notification it had been more than four times as much.

In answering questions that had been asked, he said that typhus fever had frequently occurred in Leeds. His paper illustrated the evil of not notifying, for he felt quite sure that the first case of the disease which they had been able to trace, and which had been in existence a month before they heard of it, although attended a great part of that time by a medical man, would have been at once notified to the medical officer had it occurred in Huddersfield, where notification had been long compulsory, and where the medical men were consequently much more on the lookout for the occurrence of infectious diseases than in a town like Leeds, where information was optional. The mere fact of having to notify had an educating influence upon the medical men themselves.

**Dr. Boobhyer** briefly replied.

**Mr, Biddle**, in replying, said that his chief objection was to the medical man being made the notifier, this task more properly belonging to the householder. He supported the single as against the dual system.

The three following *Resolutions* were carried by large majorities in each case:—

1. Proposed by Dr. Low (Leeds), seconded by Dr. Spottiswoode Cameron (Leeds):

“That notification of infectious diseases in all countries should be made compulsory.”

2. Proposed by Dr. A. J. Martin (Paris), seconded by Dr. Vivant (Monaco) and Dr. Janssens (Brussels):

“That it is desirable that the notification of infectious diseases should be made by the medical attendant.”

3. Proposed by Dr. Currie (New Brunswick), seconded by Dr. Farrell (Nova Scotia):

“That in the opinion of this Section notification of infectious disease should be made compulsory upon the medical attendant and the householder in whose house the disease occurred.”



### What Steps should the State take to prevent the Spread of Venereal Diseases?

BY

J. BIRKBECK NEVINS, M.D. Lond., Pres. Nat. (Brit.) Med. Assoc. for the Repeal of the Contagious Diseases Acts.



Before venturing to offer any suggestions on this important question the first requisite is to inquire what steps the State has taken in times past, and with what results; and the wider our research becomes the more strongly is the conviction forced upon us that the State, as represented by legislation, can do little directly to accomplish the object;

that legislation has proved a failure thus far; and that the only real hope for the future lies in a higher moral tone throughout the community, by which immorality will be lessened, and its consequent resulting evils to health and otherwise will be reduced.

*Past Steps adopted, and their Result.*

When the Pagan ideas and usages in connexion with prostitution were succeeded by the Christian conception of sexual vice, penance was enforced upon the sinners of both sexes. But, under the violence and harshness of the mediæval times, this penance upon both sexes was changed into public floggings and other cruelties upon the women only, while the men became exempted from public penalties, until the community revolted against the brutality of the system, and it came to an end.

Then followed (at any rate in England) a prolonged *period of laissez-faire*, in which the State nominally regarded prostitutes as "disorderly persons," but practically left them unmolested unless they were really disorderly in the streets; and this system led, it was said, to such an amount of disease (at any rate in large towns and amongst the soldiery) that Napoleon I. inaugurated the system of "regulating" the public conduct and examining officially into the health of prostitutes, which has been known since then as the *system of "réglementation,"* under the "police des mœurs" (police of (public) manners or of (public) morals). This system has been carried on with unrelenting vigour in Paris and other large cities in France for nearly a hundred years; and now let M. Lecour, the head of the Parisian police; M. Dr. Jeannel, a most ardent advocate of the system in Bordeaux; and the Municipal Council of Paris itself, be the evidence as to its results, both moral and hygienic.

M. Lecour, the Prefect of the Police des Mœurs in Paris, in the last edition of his work on prostitution in Paris, published about 1873, says at page 47:—"Not only the police but all the world knows the cause of the *increase of prostitution*—religious feeling is weakened, and tolerance of venal and scandalous intrigues has entered into our ethics." And at page 57 he says:—"We may recognise amelioration as far as outward disorder is concerned, but we are none the less sensible that the *ever-rising tide of debauchery* is due to causes which repression (*i.e.*, the police) cannot reach."

Dr. Jeannel, of Bordeaux, in his work,\* pp. 1 and 2, bitterly reproaches M. Lecour for the increase of profligacy in Paris. He says, p. 182:—"The streets of Paris and all places of public resort are crowded with the abandoned;" p. 196:—"Cabs, coffee-houses, public-houses, railway stations, theatres, hotels, lodging-houses, and shops are used as their lairs or hunting grounds;" p. 386:—"Scandalous scenes are enacted in the streets, and the *hospitals for venereal diseases* are crowded." And this, be it observed, is not the

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\* De la Prostitution dans les grandes villes, aux 19th century, et de l'extinction des maladies veneriennes. Par Dr. Jeannel, 2nd edit., Paris, 1874.

picture drawn by a "fanatic" or an ignorant opponent of the system, but by one of its most enthusiastic advocates.

*The Municipal Council of Paris*, 28th December 1880, passed the following resolution after long controversy:—"The Municipal Council, considering that the institution of the police des mœurs is "destructive of the principle of individual liberty, *without succeeding* "in accomplishing the end it proposes to aim at, *either in the diminution of venereal diseases*, or in the prevention of offences against "public order and decency;" Resolved—"That from and after the 1st January 1882, the police des mœurs shall be abolished."

The results in Brussels, after 30 years' experience, and in Zurich, might be quoted, but it would unduly lengthen this portion of the paper.

## ENGLAND.

### THE CONTAGIOUS DISEASES ACTS—"C.D. ACTS."

Influenced by reports from Paris and Brussels—but chiefly from Paris—although the amount of venereal disease in the Home Army and Navy had been rapidly and steadily diminishing for several years, the Administrative Departments of the Army and Navy succeeded in passing through Parliament, unknown to the general public, and practically unknown to Parliament itself, three Acts in 1864, 1866, and 1869, entitled the "Contagious Diseases Acts" (C.D. Acts) for the sole avowed purpose of lessening venereal disease in the Army and Navy. There was no profession of any desire to promote public order or to lessen prostitution, and the essential principle of the Acts was a combination of hygienic surveillance of common prostitutes and hospital provision for their treatment, along with a modified revival of the personal penalties upon such women which had characterised former periods of the treatment of prostitutes. The essential features of the Acts were that the women were to be placed upon the police register, and rendered subject to many penalties from which they could only be removed by magisterial authority; that they were to submit their persons to periodical examinations for the special form of disease called venereal, with all which that involved against womanhood; and that they were to go to prison if they refused or neglected to submit regularly to these examinations. They were subjected by successive Acts to greatly increased compulsory detention in hospital, from three months at first to six months in 1866, and to nine months in the "amended" Act of 1869, and if they left the hospital without the consent of the medical officer, they were to go to prison for a period of two months, but without hard labour. But as this penalty was not found to have "terror" enough, the "amended" Act of 1869 raised the penalty to *three months'* imprisonment *with* hard labour, and other penal conditions were added.



The result of this mixed sanitary and penal enactment has been, *after 16 years' adoption*—

- a. That the *rate of improvement* in primary venereal sores\* in the subjected portion of the Home Army was *reduced* from 6·7 per cent. yearly for the six recorded years *before* the Acts, to 0·65 per cent. yearly during the 16 years of the Acts.
- b. That *inefficiency* in the Navy (20,000 strong) *increased* from 172 men daily to 230 men daily.
- c. That venereal disease *rose* among the registered prostitutes by above 39 per cent. (from 121·6 to 169·5); and
- d. That the Nation and Parliament revolted against the moral and social evils of the system, and after 16 years' trial have abolished it.

## INDIA.

### THE CONTAGIOUS DISEASES ACTS (C.D. ACTS).

In 1871, an Act was passed in India for the Army there, similar to, but much more severe than the English Acts; for the fortnightly periodical examination of the women in England was replaced by a weekly or even daily examination in India, with the result that venereal diseases *rose* steadily year by year in the British troops in India from 196·8 per 1,000 in 1871—the year the Act was passed—to 389 per 1,000 in 1886—an increase of 97 per cent. in the 15 years of the Acts there.

### *New Indian Regulations and Result.*

The above increase of 97 per cent. *under* the Contagious Diseases Acts was discouraging, to use a mild term. But it is sometimes said that Englishmen never know when they are beaten; so a new and startling order was issued by the *Commander-in-Chief* in India in June, 1886, to the commanding officer in every cantonment in India.

*Regulation.*—The *medical officers* were to see that the examinations, &c., were strictly carried out, and the *commanding officer* was to take care that *sufficiently numerous and sufficiently attractive* prostitutes were provided for every cantonment, and that the quarters in which the women were lodged were *sufficiently comfortable and attractive to satisfy the demands of both the women and the men*. If their quarters did not already comply with this it was to be reported, and the deficiencies supplied as quickly as possible.

*Sanitary Result.*—The latest officially-published hospital statistics for India are for the North-Western Province of India and Oudh, 1886, containing 14 large cantonments. In four of these, one prostitute was provided for every 17 men. In three of them, one for every

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\* This one form of disease is specified because it is acknowledged in the Army reports that gonorrhea was not sensibly improved by the Acts in the subjected as compared with the unsubjected stations, and the comparison between the two classes of stations was never made for secondary syphilis.

9.9 men. In four of them, one for every 7.25 men; and in three of them, one for every 3.9 men, with the following result:—

Four stations:—One prostitute to every 17 men; cases of all forms, venereal disease\*, 170 per 1,000 men.

Three stations:—One prostitute to every 9.9 men; cases of all forms, venereal disease\*, 263 per 1,000 men.

Four stations:—One prostitute to every 7.25 men; cases of all forms, venereal disease\*, 402 per 1,000 men.

Three stations:—One prostitute to every 3.9 men; cases of all forms, venereal disease\*, 546 per 1,000 men.

As these results are not satisfactory, still more stringent regulations are talked of as necessary.

### SWEDEN.

#### PERIODICAL EXAMINATIONS OF THE WHOLE ADULT CIVIL POPULATION FOR 49 YEARS, AND THEIR RESULT.

By Royal Charters and "Instructions," which have the force of law in Sweden, the following examinations have been ordered at successive intervals, in 1812, 1817, 1822, 1824, 1839, 1843, 1864, and 1873, to the governors of counties, doctors, parish clergy, parish lay authorities, Board of Commerce, and military authorities.

Examinations for venereal disease to be made of visitors at inns, fairs, and other great gatherings of people, and also, if possible, of all market women coming to sell their wares, and pedlars must obtain renewed certificates of health every three months; wet nurses and domestic servants before engagement must produce certificates of freedom from venereal diseases, and also all babies ("foundlings") on being put out to nurse; all "herring fishermen" are to be examined on returning home, and all ship's crews must also have a certificate from the captain, of freedom from venereal disease on returning home. All young men of *twenty-one* must be examined on commencing the compulsory period of military training extended over two years. The *troops* to be examined weekly. The governors of counties are to send all infected persons to the nearest lock hospital, and in country places the parish rector (parson) has the same duty imposed upon him, and if necessary, in case of a refractory person, he must call in the aid of the county police through the county governor. All these patients are to be in hospital until cured, at the public expense, and all parishes are to levy a rate of 50 "ore" on every man, and 25 on every woman (about 7*d.* and 3½*d.* or ½ and ¼ franc), for the support of the lock wards.

*"General" Inspections.*—These are a sanitary regulation believed to be peculiar to Sweden and Finland. They used to be common in both countries, but "they were not considered to have attained their end," and now they are rarely heard of. This "general inspection" was

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\* The different forms are not recorded separately in the official Indian Hospital Reports but are classed together as "venereal diseases."

an examination, for venereal disease, of *every man, woman, and child* at irregular periods, in any suspected district of the country.

*Result.*—It would be difficult to devise a more “thorough” scheme of examinations and compulsory hospital treatment than the above, which were in force from 1812 to 1873, and then became practically obsolete. The official return of results, as announced by Professor Odmanson, at a meeting of the Swedish Association of Physicians, on the 19th February, 1889, when the subject was before the Swedish Diet, is, that in *Stockholm County (excluding Stockholm City)* (which would be like Middlesex, Kent, and Surrey, *excluding London*), venereal cases have fallen in the 49 years, from 2,741, the average of the first half of the period, to 1,665, the average of the last half, which equals a yearly average of 1·6 per cent.

It is scarcely surprising that a fall of little more than one per cent. yearly, during 49 years of all this medico-police bondage upon the public, aided by such general improvement in the education and social state of the country as has been going on at the same time, should have appeared so far unsatisfactory to the Swedish nation, that the above recorded regulations have become practically obsolete.

## DENMARK.

In 1874 it was made law that everyone, male and female, who became affected with venereal disease must go to a hospital or a private medical man for treatment, under penalty of a fine for neglect. If there is reason to think that the medical orders are not carried out, the patient must go to hospital until cured, under penalty of a fine. And every medical man, hospital or private, must send in weekly or monthly to the official registrar a report of the number of his cases.

(a.) If a wet nurse is syphilitic and takes a situation, she is subject to a fine.

(b.) Every patient, whatever his financial position, is entitled to *gratuitous* hospital treatment for these diseases, and after having had constitutional disease is bound to attend periodically for inspection as long as he is desired to do so.

(c.) These regulations are believed to have been duly carried out.

### RESULTS—ARMY AND NAVY.

VENEREAL DISEASES COMBINED.—12 YEARS, 1874 TO 1885.

*Average Ratio—the whole 12 years.*

Copenhagen	-	Réglementée	-	Fleet	-	-	38·7
"	-	"	-	-	Army	-	19·1
3 Garrison Towns		"	-	(no fleet)	"	-	8·8
4 "	"	(not)	"	-	"	-	7·5
1 "	"	Réglementation abolished in 1879	"		"	-	5·3

The whole period shows no advantage from Réglementation.



*Divided into two periods of 6 years each.*

							Increase.
Copenhagen	-	Réglementée	-	Fleet	-	2nd period	- 122 per cent.
"	-	"	-	Army	-	"	- 32 "
3 Garrison Towns	(not)	"	-	"	-	"	- 29 "
4 "	"	"	-	"	-	"	- 7 "
1 "	"	"		Réglementation			
				abolished at end			
				of 1st period	-	" - "	- 52 per cent.
							<i>reduction.</i>

The greatest proportion of increase was in true syphilis.

These results are not favourable to Danish Réglementation.

(Dr. Giersing, Ancien Médecin du Chapitre Royal à Vallo. "Revue de Morale Progressive," p. 32, June, 1877, Paris and Brussels.)

## NORWAY.

In *some* of the *larger* towns the medical men are *directed* by municipal authority, under the Public Health Act of 1860, to report *daily* any new cases of venereal disease, but not the names or address of the patients, and they are *requested* to report as accurately as possible the supposed source of contagion. This law has existed for 30 years, and "it *may* be *supposed* that in *some* towns *most* of the new cases are reported; but the request as to the source of contagion is very "deficiently attended to."

a. (My informant is not able at present to give any information as to the sanitary results of the regulation, although having exceptional opportunities for doing so, if the knowledge is attainable.—J. B. N.)

So far for the steps that have been tried by the State and their result; the judgment upon them must be left to the reader.

### *Proposed steps for Checking the Spread of Venereal Disease now recommended to this Congress for consideration.*

The foregoing drastic methods for endeavouring to check the spread of venereal disease have been actually adopted, and for periods sufficiently long to test their sanitary results thoroughly (and it is with sanitary results only that we are here concerned); and after them, the proposals I have to make will to some seem tame and feeble indeed. But the severe remedies have proved worse than failures, and possibly milder ones may succeed better. I now submit them to your consideration.

1st. *Sufficient Hospital Provision.*—To this primary requisite all are agreed who have taken part in the controversy on the subject, but the difficulty is how to obtain such hospital provision; and my remarks

must apply mainly to England, as being the country with which I am best acquainted (though they admit of easy adaptation elsewhere).

In England there are ample and sufficient hospitals, supported by voluntary contributions, for almost every form of disease and for every class in life except those who can afford to provide medical aid for themselves. But this one particular class of diseases is absolutely excluded by their rules from admission in many hospitals, and is practically excluded, though not absolutely forbidden, in many others. The reasons for this are various and difficult to be overcome; and we have to deal with the fact as it is—that primary venereal diseases are almost the only form of disease for which there is not provision in ordinary voluntary hospitals, and which the subscribers will not admit.

In this country there are also hospitals provided by the Poor Law Authorities, bound to admit “pauper” patients for hospital treatment, but none except paupers; and these hospitals are to a limited extent under Government influence; but the managers and officials of many of these Poor Law Hospitals are unfavourable to the reception of venereal cases, and throw obstacles in the way of admission. In some of these hospitals the authorities urge that the cases of this disease are due to the presence of soldiers and sailors, who are national servants; and the national funds therefore—not the local inhabitants—should be responsible for their hospital treatment.

*The important and really very difficult question therefore arises*—How is this requisite hospital assistance to be provided? Upon which I would urge strongly the following resolutions, passed by the Geneva Congress after discussion extending over many days, by the Hygienic Section of the British and Continental Federation for the Abolition of State Regulation of Prostitution, which was held in Geneva in 1877. This Congress consisted of about 500 members, representing 17 nations of Europe and America, and the members of the Hygienic Section were medical men, lawyers, statesmen, and others, all well qualified by experience of hospitals and of life, to form an opinion on such a question.

*Resolutions* :—“1st. That self-control in the relations between the sexes is one of the indispensable bases of the health of individuals and of communities.

“2nd. The Section of Hygiene desires especially to see removed all obstacles which at present prevent venereal maladies from being as extensively treated as every other form of disease in the hospitals which are controlled by municipalities and other public bodies, as well as in those which are supported by private liberality.”

If the State, acting in its national character, were to *urge this recommendation upon the managers of all voluntary hospitals*, such an appeal would carry much greater weight with the committees of such hospitals than if it was made by any private or irresponsible organiza-

tion; and if it should even be made unsuccessfully the first time, it might be successful if repeated once and again after some interval of time; and the Poor Law Minister of State would appeal with great weight to the managers of the Poor Law Hospitals, and would probably not make a persevering effort without an encouraging amount of success.

It is quite probable that some hospitals, both voluntary and official, might raise the objection above alluded to, that it is unfair to lay upon the subscribers to voluntary hospitals, or upon the local inhabitants, a burden that the State ought to bear for the treatment of disease arising largely from the national forces; and in such a case it would seem fair and wise that the State, through Parliament or otherwise, should recognise its responsibility, and subsidise the Poor Law Hospitals, to an equitable extent, in the districts where many soldiers and sailors in the Navy are collected. This is already done by votes in the House of Commons in the case of Portsmouth and some other large military stations; and it would only be extending the application of the same principle in subsidising beds in other Poor Law Hospitals, if the circumstances of the neighbourhood rendered this desirable.

In the case of hospitals supported by voluntary contributions, the same principle might be applied of subsidising beds—more or fewer—in cases in which the neighbourhood of troops rendered such assistance equitable.

The State would thereby be simply providing that this one form of disease, previously and exceptionally excluded from treatment, should have the same opportunity of medical aid as all others. It would not be making an exception in favour of immorality in this particular form of disease, and so, in some sense patronising it. It would simply be giving it an equal chance with others of obtaining medical aid.

In the case of voluntary hospitals, however, it is probable and almost certain that difficulty would arise from State aid to a voluntary institution. For the managers of such hospitals are jealous, and very rightly so, of any external interference with their independence; and everyone of experience is aware of the tendency of Government officialism to claim the right of interference, and gradually and almost inevitably to encroach more and more upon the independence of others. It may therefore be a difficulty of magnitude to arrange how the Government should subsidise beds in a voluntary hospital without coming in conflict with the local independent managing body. And after long and anxious consideration and consultation with others, the only solution of the difficulty that I can suggest as practicable is that the Government, after due inquiry as to the necessity of the case, should simply subsidise "so many" beds, and be content with a yearly report from the management that "so many" beds have been actually in use for the purpose intended by the State aid, and should then maintain or increase or lessen its grant in proportion to the work done, without any attempt at interference with the management of these beds or the



hospital generally\* beyond the following conditions, which should be imperative.

*Condition in every Case of Subsidy.*

*The admission of all patients to subsidised beds must be free to both sexes and to all ages, and their stay in the hospital must be absolutely voluntary.*

*a. The absence of compulsion is a sine quâ non*, and upon this point the following evidence is important.

The compulsory examinations of the women, and their compulsory detention in hospital, under every system of Réglementation and Contagious Diseases Acts, has led to such an amount of clandestine prostitution and of concealment of disease in order to evade hospital detention, as is acknowledged by all continental authorities—police and medical—and by nearly all the evidence as to the practical working of the Contagious Diseases Acts in England. Compulsory detention, however strongly it may be advocated as theoretically desirable, is practically fatal to success.

*Glasgow Lock Hospital.*—This hospital furnished a striking illustration. Admission was made free to all applicants, with great benefit to the health of the city, but the managers imposed one condition, viz., that the patient should sign a voluntary undertaking not to leave the hospital without the consent of the medical officers. Even this purely voluntary engagement was, however, soon found to operate so unfavourably by deterring diseased persons from applying under such an engagement, that the managers of the hospital withdrew the condition, and made entrance and discharge alike absolutely free, with the result that there is now no hesitation in applying for admission at an early stage of the disease; and that the health of the city, as regards this form of disease, has been most favourably influenced.

*House of Lords Committee, 1868.—Report.*—This Committee was appointed to inquire into the operation of the Contagious Diseases Act of 1866, shortly after its enactment, and to advise as to future steps. Their report is as follows (p. v.) :—

*a.* “Although in London and other large centres of population it may be requisite that separate lock hospitals should be established, the

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\* An important illustration of the practicability of this proposal is to be found in what, in England, is now well known as the “Hospital Sunday Fund.” Collections are made in nearly every place of worship in the kingdom on one Sunday each year, and the amount then collected is disposed of without appeal by committees of benevolent persons entrusted by the community with this duty. Hospitals desiring assistance make their application and submit their last annual report of work done, the income and expenses, &c., to the local committee, which takes into consideration the public importance of the hospital, the amount and character of work done, and the necessities of the hospital for aid, and then apportions its grant without any attempt whatever at interference with the way in which it is employed. The same investigation is made year by year, and the grants are proportioned accordingly. This system has been in operation for many years with unchallenged satisfaction.

evidence more generally recommends the establishment of lock wards attached to existing hospitals as most to be desired. It is important to remove every impediment to voluntary application for treatment at the earliest stages of disease. It is also very desirable, on religious and moral grounds, that there should be separate wards for the classification of the patients, so that the married woman, the fallen but not irreclaimable girl, and the most hardened prostitute should be properly separated."

*The Chairman of the Committee, Viscount Lord Lifford*, added the following, as representing the evidence more perfectly still (Draft Report, p. x.) :—

a. "The present experience of the working of the Act (1866) tending to show that its success has been much caused by the voluntary entrance into the hospitals by the women, and that many women of good character are the unfortunate victims of disease through no fault of their own, the Committee recommends that the lock wards should be administered as privately as possible, and should be subdivided, &c.," as already mentioned.

*The Royal Commission*, 1870, was appointed to inquire into the whole working, moral, social and sanitary of the Contagious Diseases Acts, in consequence of the public sentiment against the system, aroused by the new and additionally penal contents of the "Amended" Act of 1869. At that time all officialism was in favour of compulsion, and the public mind had not had time or opportunity for considering the subject maturely, the Acts having been passed with the public practically unaware of their nature. The evidence was, therefore, largely official, and the Report of the Commission appears to incline in favour of compulsory rather than of voluntary hospitals.

*Report*, 1871, sec. 63.—"We recommend that aid be given to lock hospitals, or to hospitals with lock wards attached, from the public funds," and in the same section the Commission speaks favourably of Mr. Prescott Hewitt's evidence before the Lords' Committee. "It would be to the interest of every hospital that there should be a syphilitic ward attached to it.—I have no doubt that if *there were a little pressure put upon the hospitals* every hospital would be too glad to do it."—"Mr. Hewitt prefers the addition of lock wards to existing hospitals rather than the establishment of hospitals for the treatment of venereal diseases exclusively, and gives, we think, sufficient reasons for his opinion, viz., that women entering a lock hospital are at once stamped by doing so, while no reproach attaches to them if they have simply been in St. George's, Guy's, or St. Bartholomew's, &c., hospital. As to the general hospitals, it would be difficult to manage them upon any other than the voluntary principle. So essential, however, is detention to the effectual working of the hospital system, that we would exact that women applying for admission should remain for a period not exceeding three months." The difficulty of the question is, however, exemplified by sec. 52 in

the same report, in which the Commission says, "As regards voluntary applicants, there could be no objection to the patients being required to enter into an engagement to remain until discharged by the hospital authorities.—*We are assured, however, that few women would enter under such a condition.*"

a. Sec. 66.—"We recommend that the periodical examinations be discontinued."

*National (British) Medical Association for the Repeal of the Contagious Diseases Acts.*—In 1880—ten years after the Royal Commission report, and after much experience had, in the meantime, been accumulated, this association published a pamphlet, entitled—"What public measures can with benefit be adopted for the diminution of venereal diseases?" The pamphlet rapidly passed through six editions, and many thousand copies were sent to all the voluntary hospitals in Great Britain—to the members of both Houses of Parliament, to some corporations, and to other public bodies, &c. Its recommendations were substantially those now advocated in this paper, except that no allusion was made to State subsidies of poor law or voluntary hospitals.

#### BRITISH AND CONTINENTAL FEDERATION FOR THE ABOLITION OF STATE-REGULATION OF PROSTITUTION, GENOA, 1880.

The Congress of this Federation, held in Genoa in 1880, translated the above pamphlet into Italian, in which language it was read to the Congress, and copies in Italian or in English were distributed to the members. This Congress consisted of about 400 members, representing 14 European and American nations; and at the close of its sittings, a resolution was passed adopting the paper generally as expressing its views on the subject of *free admission to hospital and the absence of compulsory detention*, though without committing itself to every detail.

#### SELECT COMMITTEE OF THE HOUSE OF COMMONS, 1879-1881.

The latest official utterance on this subject is from the above Select Committee in its two reports in 1881.

The Committee, as originally appointed, consisted of nine members, who had either voted previously *in favour* of the Contagious Diseases Acts once or oftener or had otherwise publicly advocated them; and of six members who were similarly committed *against* the Acts. The Committee took evidence for three years and then reported, after above 70 divisions before the report was agreed upon. With one exception, on a matter of detail, every one of the nine voted for the report in favour of the Acts, and every one of the six voted for another report against them. The House of Commons ordered both reports to be published and issued together. One is here described as the "majority" report—the other as the "minority" report. They were diametrically opposed to each other on this as on almost every other question.



*Majority Report, pp. xxix-xxx.*

"Your Committee consider that compulsory detention in hospital is absolutely necessary for the effectual cure of disease, and they recommend its maintenance as at present." (Nine months.)

a. "Your Committee recommend the institution in some of the unsubjected districts of *female lock hospitals*, supported by State aid and charitable contributions, to which *entrance shall be voluntary*."

*Minority Report, Section 16.*

The mitigation of disease could be effected in a voluntary hospital as well as in a compulsory one, *provided that the requisite co-operation of the patient was secured.*

a. The practical question is whether results, equally beneficial as regards the prevention and cure of disease, can be attained without the compulsory periodical examinations and the restrictive hospital system of the Acts. The evidence on this subject relates to the four principal voluntary lock hospitals in the United Kingdom, viz., London, Dublin, Glasgow, and Liverpool, and also to two smaller hospitals instituted by the rescue societies in London and Bristol.

b. [The evidence on this subject in the minority report is long and careful and ought to be studied in extenso. The following is a brief extract of it.]

c. *London*.—Mr. Lane. Beds divided between Government and voluntary patients.

d. Number of "voluntary beds" very inadequate, therefore only the *worst* cases are admitted, while on the Government side every case sent compulsorily is admitted, however slight. The voluntary cases are therefore the most severe and take the longest time for their cure.

e. The women voluntarily remain for long periods, even as long as 86 days on the average in 1873 down to 37 days in 1880, when the cases had become milder. About 20 per cent. left before being completely cured, but 29 per cent. of the patients (in 1881) were married women and domestic servants who would not leave to go to prostitution.

f. The deputy chairman gave evidence that "the Government patients are more difficult to manage than the others *because we cannot control or dismiss them*. On the voluntary side we can dismiss them, "and that makes a great difference." This implies that premature dismissal is regarded as a punishment, not a boon, by the voluntary patients.

g. *Dublin*.—Mr. Macnamara. Voluntary. Cases bad. Mild cases do not apply. The majority left before complete cure, but 40 per cent. of the patients are not prostitutes, and would naturally be anxious to go. Mr. Macnamara prefers free lock hospitals, with inducements to women to remain voluntarily, but with power to detain when necessary.

h. *Glasgow*.—Dr. Patterson. Voluntary. Beds at first too few—increased from 36 to 60 in 1870. Never all required now. The

severity and amount of venereal disease had diminished in Glasgow in recent years. No case is ever refused admission. Cases apply earlier than formerly. Very few cases leave uncured. No trouble in inducing even prostitutes to remain. In 1871 the directors required the women to sign an engagement not to leave before they were cured, but that was soon abandoned as it was found to prevent the women from applying for admission.

*i. London Rescue Society's Hospital.*—Mr. Cooper. About 10 per cent. leave uncured, but not to go to prostitution. The average stay of the patients in the London Rescue Hospital is 74 days.

*j. Bristol.*—Lock Hospital. Small and voluntary. About 12 per cent. leave uncured.

*k. Liverpool.*—Mr. Lowndes. Voluntary. Female beds were not filled while students were admitted to see the patients. They are now excluded and the beds are well filled. The place has also been made more attractive, and menial work (scouring the floors, &c.) is not now required from the patients. Nearly all are prostitutes, except about 10 or 12 per cent. married women. In 1880 about 12 per cent. left uncured, chiefly married women. Witness wished to possess the power of compulsory detention.

*l. Large Workhouse Hospitals.*—Dr. Nevins had obtained returns from 80 out of 160 of the largest workhouses, and the medical officers say, “with scarcely an exception,” that the patients can easily be induced to remain in the hospital as long as they think necessary without the employment of compulsory detention. The witness was not, however, allowed to hand in the answers or to complete his evidence on the subject in consequence of a decision by a majority of the Committee, that a witness who had *collected* evidence should not be permitted to state the general result of the information so received.

*General Conclusion.*—Upon the whole the evidence afforded sufficient proof that the system of *free* hospitals, *attractively equipped*, *well officered*, and “no case refused for want of room” (the Glasgow rule), is quite practicable and completely successful, even without the power of compulsory detention. Taking the evidence as it stands it appears certain that the number of actual prostitutes who would discharge themselves prematurely from hospital for the purpose of resuming prostitution is proportionately small, and probably does not exceed (even if it equals) the number of those who, in places subjected to the Acts, now actually evade registration. These “clandestine” prostitutes are precluded from hospital treatment altogether, for the workhouse authorities, in subjected districts where hospitals certified under the Acts are established, no longer receive female venereal cases, except occasionally from such hospitals.

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The steps that have been adopted in past times and those which I have ventured now to submit for your consideration, having

been passed in review, I will conclude by laying before you some *proposals* that have been made from Austria, France, America, and Portugal for the purpose of preventing the spread of venereal diseases, but which have not been submitted to the test of trial, since the experience and failure of Sweden, already recorded. It will be for your judgment whether they deserve praise or blame from this International Hygienic Congress.

### VIENNA.

#### RESOLUTION PASSED BY THE INTERNATIONAL MEDICAL CONGRESS IN VIENNA, 1873.

At the International *Medical Congress*, which met in Vienna in 1873, *it was resolved* that a proposal should be submitted to the Governments of Europe, to which, however, it was feared that England would prove an obstacle. The proposed plan was to be rendered effective by international treaties between the different States, and among other points considered necessary were the following:—*Municipal* and *provincial* authorities are not to be trusted with carrying it out, but the administration of the suggested law throughout the whole country is to be *solely in the hands of the Central Government*; all bodies of people—such as soldiers, sailors, policemen, *civil servants in the employ of Government*, men or women working in *factories, domestic servants*, and all concourses of people, as at *fairs, markets, pilgrimages, &c.*—are to be subject to strict medical examination; all expenses shall be paid out of the Government taxes—not out of local rates—by which all local checks upon expenditure and other local objections will be prevented; and lastly, “*a sufficient number of medical men shall be employed and handsomely paid*” for working the system.

### LYONS.

This was also a recommendation, in almost identical words, from a commission appointed in Lyons by the French Government, to report upon the subject of preventive measures and regulations. It contained also the following addition—

That the keepers of brothels *shall be responsible to the men who frequent them, if they contract disease*, for, “*Is it not just that authorised brothels should give to the public every possible security? Is it not just that the mistresses of these houses should suffer for their want of care when they have not fulfilled the conditions of the contract? And among these conditions are most important ones, that they shall take care of the health of their unfortunates, and preserve from every risk the men who go to seek in their houses pleasures reprovéd, it is true, by morality, but not forbidden by law.*”

#### INOCULATION WITH SYPHILIS RECOMMENDED IN THE VIENNA CONGRESS.

At the above Medical Congress of Vienna, Dr. Auzias Turenne dwelt upon the importance of *inoculating all male children with syphilis* as a safeguard against their contracting it for themselves in



future. It seems scarcely possible to credit that a man of reputation could seriously propose to a medical congress that every male should be saturated with this loathsome disease in childhood in order to save it from contracting the disease in manhood; and that an assembly of educated men could sit and patiently listen to such a proposition without an indignant denunciation, and even without a protest.

Circumcision of all male children was recommended to the same Congress by Dr. Cohen.

## 56. AMERICAN PROPOSITIONS.

MADE TO THE MEDICAL ASSOCIATION OF THE U.S. AMERICA, BY DR. MARION SIMS, 1876; AND BY DR. GIHON, MEDICAL DIRECTOR-GENERAL OF THE U.S. NAVY, 1879.

At the annual meeting of the Medical Association of the United States of America, held in Philadelphia in 1876, the members, numbered by hundreds, and representing the medical profession of the whole of the United States, Dr. Marion Sims proposed that on every ship coming into the United States from a distant port, the male *steerage* passengers should be compelled to submit to a personal examination for venereal disease; but the *cabin passengers should be free*. The sailors before the mast must submit to be examined, but *the officers should be free*. The examination was to be made by a doctor, if there was one; but if there was not a doctor, these free men and citizens of various kingdoms of the world were to submit their persons to examination by the quarantine officer of the ship. And if, in the opinion of the examiner, they were diseased, these free men were to be sent to hospital and detained there (regardless of their families) or they *were to be sent back to the country from whence they came*. And this proposal, accepted with acclamations of applause, was ordered to be printed, and circulated gratuitously.

At the annual meeting of the same medical society, held in New York in 1879, Dr. Gihon, the medical head of the United States Navy, urged upon the meeting that "*a well organised sanitary service, with its agents, be established in every hamlet, village, town, and city of the country. Let these agents find out the progenitors of contagious (venereal) diseases, and having discovered them, be empowered to isolate and exterminate them. Let them track syphilis to its lair, and, whether in man or woman, in any way and at any cost, let them make it impossible for another human being to come within its baneful influence. . . . There is an army of doctors overspreading the country, and annually recruited by thousands. Why not transform these men, of whom so many idly and hungrily await the prey stricken down for them by disease, into busy workers keenly on the scent to avert that which now they cannot but welcome.*" The reporter adds, that the applause at the close of the address was hearty and prolonged, and, immediately on its conclusion, a motion was unanimously adopted to appoint a Committee, with Dr. Gihon for its chairman, to consider the suggestions of the address, and report to the next

meeting resolutions looking to the *establishing of a plan for protection* from venereal diseases.—From the *Sanitarian*, January, 1880, New York.

[I believe, however, that the Committee never reported.—J.B.N.]

PROPOSALS TO THE INTERNATIONAL MEDICAL CONGRESS IN  
LONDON, 1881, SECTION OF STATE MEDICINE.

By Dr. CUNHA BELLEM, LISBON, Member of the Royal  
Academy of Science.

The tyranny of syphilis can only be counteracted by the *tyranny of inspection*. If everyone can *demand as a right that, even as the result of imprudence, he shall not contract syphilis*, no one can have the right to transmit it to others, and in order to guarantee this liberty, there is no other resource than the *inspection* of all persons *suspected* of having syphilis. Syphilis will in the end be got rid of, or it will at least be banished into the sanctuary of married life, where it cannot be subjected to any controlling influence.

By Dr. B. KRAUS (VIENNA).

He believed that public prostitution could be effectually controlled, provided all prostitutes were compelled to ply their trade in licensed brothels. As regards clandestine prostitution, no remedy would be satisfactory short of an *enforced examination* of the *working classes*, through whom the disease was mainly spread; and a series of propositions were laid down as to the *periodical examination of artizans in factories*, and *domestic servants, both male and female*, the examination to be followed by the issue, free of cost, of a *certificate of health*. In this way only could persons be saved from the risk of syphilis being conveyed to their children by nurses, and to themselves and their families by means of infected food, &c. The remedy, he admitted, was a severe one, but it was the only efficacious one, and *he trusted the Congress would bring the subject under the notice of the Government*. (After the discussion which took place in the State Medicine Section, no attempt, however, was made by the advocates of the system to carry any resolution in favour of Regulation of Prostitution.)

To sum up these recommendations, the steps now proposed to you are, that—

a. The *State* should *urge*, perseveringly if necessary, all voluntary and poor law or municipal hospitals to admit venereal cases, whether male or female, *freely* to treatment on an equal footing with all other forms of disease.

b. That entrance to the hospital should be encouraged rather than discouraged, so as to attract the cases in their early stages; and that while the patients are encouraged and even urged to remain until cured, no compulsion whatever should be employed to detain them.

c. That the State should, if necessary, subsidise beds for venereal cases in existing hospitals, whether voluntary or under public control;

but should not establish separate new lock hospitals. And in the case of hospitals, whether voluntary or supported by public local funds, the State should strictly abstain from any attempt at authority in the hospital, or interference with the existing managing bodies.

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**On the Sanitary Condition (*re* Venereal Diseases) of the British Home Army previous to the Contagious Diseases Acts, during their Operation, and since their Abolition.**

BY

J. BIRKBECK NEVINS, M.D. Lond., President of the National (British) Medical Association for the Repeal of the Contagious Diseases Acts.

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In 1860, and for some years previously, the amount of venereal diseases in the British Home Army and Navy was large and alarming to the Administration.

Lord Herbert, at that time H.M. Secretary for War, appointed a Commission which made many most important recommendations, moral, social, intellectual, and sanitary, for improving the character, surroundings, and health of the Army.

These were carried out in a large portion of the Army as rapidly as the votes in the House of Commons made possible (Evidence of Select Committee, House of Commons, 1881, Ques. 2854-8 and 2971-3), but slowly and imperfectly, or not at all, in another large portion of the Army (Evidence above), with noteworthy results.

As "the conditions of residence in camps and in towns are different," the health of the Army was at that time, and until 1867, recorded in the Army Reports for "Camps" (Aldershot, &c.), "Seaports" (Portsmouth, &c.), "Arsenals and Dockyards" (Woolwich, Chatham, &c.), "London," "Dublin," "Manufacturing Towns" (Manchester, &c.), and about 100 "Remaining Stations" of no specially marked character.

Lord Herbert's improvements were applied rapidly as above mentioned to the "Camps," "Seaports," and "Dockyards," with a reduction of primary venereal sores in six years of 28 per cent. in the "Camps," 29 per cent. in the "Seaports," and 38 per cent. in the "Dockyards" (calculated from the Army Reports, 1860-66), *before the Act of 1866 was passed.*

The improvements were applied slowly as above mentioned to London, Dublin, and the manufacturing towns, and on the average of the six years London was worse than at first, Dublin was the worst throughout the whole period, and the manufacturing towns, which were largely diseased, improved only 21 per cent. instead of 28, 29, and 38 per cent.



Notwithstanding the above continuous great improvement the Contagious Diseases Act of 1866 was passed, and it was applied to *all* the camps, *all* the seaports, the dockyards, and to five other less important places from the "remaining stations," making 14 stations in all which were selected and put under the Acts, and Lord Herbert's improvements were pushed on more earnestly still (Evidence as above).

This group of 14 stations had improved without interruption for the six years before the Acts were in existence at the average yearly rate of 6·7 per cent. upon the original amount of disease.

On the other hand, London (which had fallen off instead of improving), Dublin (the worst station throughout), four of the largest manufacturing much diseased and slowly improving towns, and *one* dockyard were selected for comparison, and the number of 14 was made up from the "remaining stations." These 14 stations were *not put* under the Acts, and Lord Herbert's improvements were carried on inefficiently and slowly as before (Evidence as above).

When the Acts were added to Lord Herbert's improvements, it was expected that the improvement in health would be much more rapid than before; but, instead of that, it was reduced to the average of only 6·3 per cent. upon the remaining amount of disease for the first six years of the operation of the Acts.

The then Secretary for War, Lord Cardwell, therefore now endeavoured by punishment to obtain a more favourable result, and accordingly in 1873 he stopped the pay of every soldier who was in hospital for primary disease. The result naturally was that the men concealed their disease from the Army doctors, and went to druggists or to other soldiers for treatment, and a large apparent reduction of disease immediately took place, and continued for three years at nearly double the rate of the six years previous to concealment.

At the end of these three years, however, in spite of the Acts and of concealment combined, disease commenced to rise rapidly, and continued to do so for four years at the rate of 22·7 per cent. yearly, until in 1879, after seven years' trial, punishment was removed. After this, the increase in disease continued for three years longer, until its amount had much more than doubled, the stations being (seven years—1875–82) still, however, under the most perfect operation of the Acts.

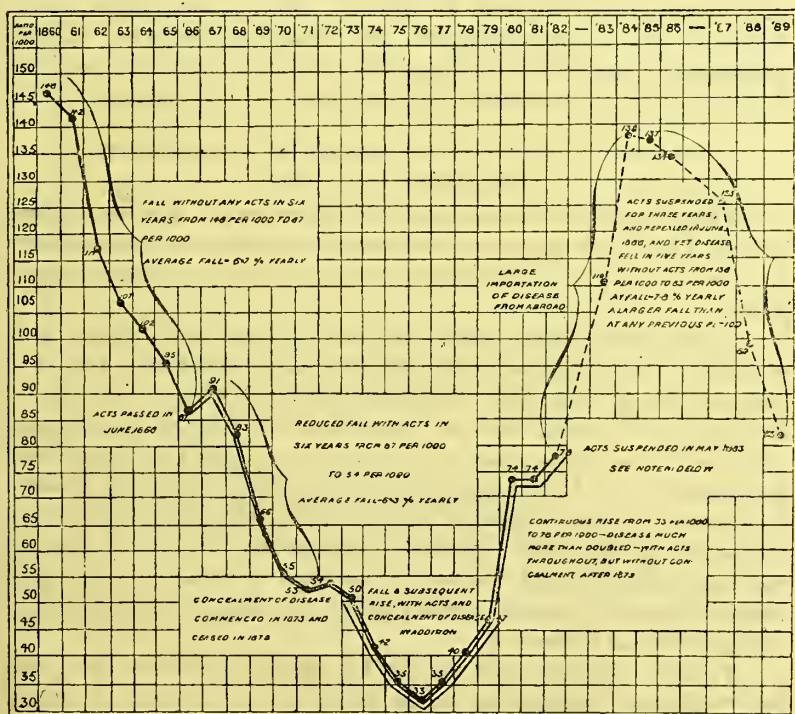
The result was that at the end of 16 years of the Acts, primary disease was only 9 per 1,000 less than it was in 1866, before the Acts were in existence, being an average improvement of only 0·65 per cent. yearly, instead of the improvement of 6·7 per cent. yearly for the six years previous to the Acts being in existence.

In the middle of 1883 the compulsory periodical examinations of the women, which are the essence of the Acts, were suspended by a resolution of the House of Commons, and immediately a most rapid increase of disease commenced, and continued until the autumn of 1884, when it ceased, and disease began to fall. This large and sudden increase was a cause of alarm to many Members of Parliament, who attributed it—not unnaturally perhaps—to suspension of the Acts.

The Secretary for War, however (the Marquis of Hartington), ascribed it in the House of Commons to the return of the troops from Egypt, where they were much diseased, and the subsequent Army reports, 1883-84, showed the correctness of his explanation, for many of these troops stopped in Malta, and many others in Gibraltar, on their way from Egypt, while the remainder returned to England. Both Malta and Gibraltar had always been and still remained under strict Contagious Diseases Acts, but the increase in 1883 was 98 per cent. above 1882 in Gibraltar, and 76 per cent. in Malta, while it was only higher by 42 per cent. in England. The increase continued in all three countries until the autumn of 1884, when the return of the troops ceased, and *disease began to fall*.

AMOUNT and COURSE of PRIMARY VENEREAL SORES in the 14 STATIONS put UNDER REGULATED PROSTITUTION (the Contagious Diseases Acts), from 1860 to 1889.

The Table embraces six years *before* any Acts, 16 years of their operation from 1866 to 1882, three years of *suspended* Acts, and four years of *repealed* Acts.



The single line indicates Lord Herbert's Commission alone in operation; the double line, the Acts in addition; the treble line, concealment also influencing the amount of disease; and the broken line, the altered condition of suspended and repealed Acts.

In 1886 the Acts were totally repealed, and in the five years since 1884 (to 1889, the latest year recorded) there has been an unbroken continuous fall in primary disease of 7·8 per cent. yearly in the 14 stations formerly under the alleged protection of the Acts instead of the continuous *rise* of 22·7 per cent. yearly during the last seven years of their operation. The fall in disease has not been so rapid in any period of the Acts as it has been during the five years since their suspension and repeal.

Throughout this paper primary venereal sores (called always primary "syphilis" in the Navy reports) have alone been spoken of, for it was acknowledged in every Army report that the Acts had produced no improvement in gonorrhœa in the stations under the Acts compared with those not under them, until concealment of disease commenced, and in the Navy gonorrhœa rose steadily in amount from 20 per 1,000 in 1886 to 78 per 1,000 in 1882, the last year of the Acts, and its severity also increased from an average duration of 17 days per case at first to 27 days per case at last.

Secondary syphilis was never computed for the subjected stations as compared with the unsubjected ones because the place where the primary was contracted was always uncertain. On the average of the whole 16 years of the Acts the amount was, however, higher in the Army as a whole by one-thirteenth than it was in 1866, when the Act was passed, so that the Acts have produced no benefit to the community as a whole in this constitutional and hereditary form of disease.

#### COMPARATIVE AMOUNT OF DISEASE IN THE STATIONS NOT UNDER THE ACTS.

The troops in the Home Army *not* put under the Acts were nearly half the Army, and they were distributed throughout the whole country in about 120 stations, in the largest towns as well as in smaller country places.

It has been already shown how 14 of these 120 stations were "selected" for comparison with the 14 stations under the Acts, and their amount of disease was unquestionably much higher than that in the subjected stations. But the other hundred (more or less) stations contained more troops than the selected ones, and they were never mentioned in the Army reports at all until 1875; nor was it possible to learn the amount of disease in them until 1885, when a return was ordered by the House of Commons (Parliamentary Paper 325, Col. 19, 6th August 1885), which showed the amount of disease in these previously "rejected" stations, from 1860 to the date of the Return, and the result was as follows :—

Primary venereal sores in the 14 stations under the Acts, the 100 "rejected" stations *not* under them, and the 14 stations always "selected" for comparison not under them, for the whole period of the Acts (omitting the years of concealment of disease) :—

14 Stations, under the Acts, average ratio 70 per 1,000 men.

100 Stations, not under Acts, previously "rejected" from comparison, average ratio 74 per 1,000 men.



14 Stations, not under Acts, but always "selected" for comparison, average ratio 136 per 1,000 men.

The 14 stations put under the Acts, and specially favoured both beforehand and also afterwards as already mentioned, can show barely an advantage over the 100 *rejected* stations not under them, while the group of 14 containing the specially bad and from the first neglected stations already described, were "selected" and have always been used for comparison to show the alleged injurious effect of the absence of Acts, and of that alone.

The sanitary results above shown previous to the existence of the Acts, during their operation, and since their repeal, afford no grounds for desiring their restoration or for attributing benefit to them during their continuance.

#### WHAT INFLUENCE HAS THE REPEAL OF THE CONTAGIOUS DISEASES ACTS HAD UPON THE HEALTH OF THE CIVIL POPULATION?

There are no known data for answering this question as to the general community; but there is one class of young men respecting whose *health* there is official information, viz., the Army recruits.

These youths are collected from all parts of the country, and they are of an age and in circumstances that would render them specially liable to be influenced by any condition likely to affect sexual diseases favourably or unfavourably. They number about 40,000 or 50,000 a year, and are carefully examined medically before being finally accepted. Any disease for which they may be rejected is recorded in the Army reports year by year, and these reports show the following results for the last four years during the operation of the Acts, and for the last five years since they have been repealed:—

Recruits rejected for *syphilis*, per 1,000 recruits:—

1879 to 1883, with Acts, average 10·1 per 1,000.

1885 to 1889, without Acts, average only 8·1 per 1,000  
an *improvement* of 19·8 per cent. since the repeal of the Acts.

Rejected for "*impaired constitution*," which is so often the result of sexual misconduct:—

1879 to 1883, average 8·67 per 1000.

1885 to 1889, average only 6·01 per 1,000.  
an *improvement* of 30·7 per cent. since the repeal of the Acts.

So far, therefore, the only available evidence shows that the repeal of the Acts has not been followed by injury to the public health but rather by improvement.

#### DEATHS.

Stress has lately been laid upon some changes in the mortality from syphilis which are claimed as telling in favour of the Acts. Any inferences from the deaths from this disease are surrounded by fallacies and doubts, for the deaths per million of population are so few that two or three more or fewer make a sensible difference. There has also

been a great change in recent years in the views of the medical profession as to syphilis causing death where formerly it was not thought of as the cause. The deaths fluctuate largely from year to year in the individual districts, and the Registrar-General has never recorded the deaths from syphilis in the towns under Acts, and in other large towns without them, so as to enable a comparison to be made between different periods and different towns. Lastly, as death from syphilis does not generally occur until many years after infection, it is impossible to know whether the disease was contracted in the same town, or even in the same part of the world in which the death occurred.

London, however, with its large population, and England with its 29,000,000, are always recorded, and the following results may be taken for what they are worth :—

*Deaths* per 1,000,000 of population in England as a whole :—

7 years before the Contagious Diseases Acts, average 68 per 1,000,000.

16 years of Contagious Diseases Acts, average 84\* per 1,000,000.

6 years since Acts ceased, average 76 per 1,000,000.

showing a considerable fall since the Acts were terminated.

*Deaths* per 1,000,000 in London (never under the Acts) :—

7 years before the Acts - - average 119·5 per million

16 years of operation of the Acts - „ 132·3 „

6 years since the Acts ceased in 1883 „ 117·7 „

Again a fall in mortality since the Acts ceased, and a large one.

From these two results it appears that after six years' experience London, and England as a whole, have not so far suffered from the repeal of the Acts; but it is not safe to draw a wider conclusion than this at present.

#### NO REDUCTION OF HEREDITARY MORTALITY FROM SYPHILIS DURING THE OPERATION OF THE ACTS.

The most authentic and reliable information in possession of the medical profession and of the public on this point is given by Mr. Humphries (at that time senior clerk in the Statistical Department in Somerset House), who published a communication on the subject in the *British Medical Journal* in July 1876. The Acts had at that time been 10 years in operation. Mr. Humphries had access, from his official position in the Registrar-General's Office, to details to which the public has no access, and his communication was expressly upon the sanitary results of the Acts in the *places* themselves to which they had been applied—not to some assumed area 20 or 30 miles surrounding those places. He there says definitely that *there was no reduction in the mortality from hereditary syphilis in the stations under the Acts*. This statement is of unusual importance, for it is, we believe, the only

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\* It was about the beginning of this period that the change commenced in medical opinion as to syphilis causing death. The Registrar-General frequently commented upon it as probably influencing the apparent great increase of mortality.

distinct evidence on the subject accessible to the public. The Registrar-General's returns do not classify the deaths from *infantile syphilis* in the separate towns, and there are no official data with which we are acquainted that assist in showing whether infantile mortality has increased or diminished in the stations formerly under the Acts since their practical abolition in 1883.

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On the Duty of the State with respect to the spread of  
Venereal Disease.

BY

J. HOLROYDE, M.R.C.S., D.P.H., Medical Officer of Health for  
Chatham.

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In approaching the subject of State regulation of venereal diseases I will first of all briefly relate the history of legislation on this point. The first Contagious Diseases Act, for the prevention of contagious diseases at certain naval and military stations, was passed in 1864. This Act was of temporary duration, and in 1866 was superseded by a permanent Act, the provisions of which, although slightly amended in 1868-69-75, remained in force until the abolition of the compulsory clauses in May 1883, and the total repeal of the Acts in the year 1884. The substance of the Act was as follows:—Certified hospitals for the reception of women suffering from venereal diseases were established at the stations named in the Acts (14 in number), and an inspector of hospitals was appointed for each place. In cases of well-proved prostitution a woman was compelled to appear before the medical officer, and if found to be suffering from disease could be detained for three months, or until cured. Insubordination, or refusal to be examined was made penal, and keepers of houses of ill-fame who knowingly harboured any woman suffering from disease, were subject to fines or imprisonment at the discretion of the justices.

The subject was exhaustively inquired into by a special commission, which, after sitting for four years completed its inquiries in 1882, and which, reporting on the evidence before it, was strongly in favour of the retention of the Contagious Diseases Acts in our garrison towns. The House of Commons, however, voted against this recommendation, abolishing the compulsory clauses in 1883, and finally repealing the Act in 1884; and at that time it was prophesied by the supporters of these Acts that certain definite results would follow their repeal, viz.:—An increase of disease in the Army and Navy, increased disease and suffering amongst the unfortunate women who had been under the control of the Acts, and also an increase of general immorality, and of juvenile prostitution. Have these prophecies been fulfilled? The experience of



a large garrison town which has been under the operation of the Contagious Diseases Acts, and thereby affords means of comparison between its condition prior to and since their repeal, will supply an answer; and I will as briefly as possible endeavour to place before you the results of my observations and inquiries in the Chatham district, and to indicate the conclusions I have formed as the result of these observations. It is generally admitted in the town of Chatham that since the repeal of the Contagious Diseases Acts there has been great increase in the number of prostitutes, and especially of juvenile prostitutes, and there is a very strong feeling amongst many of the leading inhabitants that a retrograde step was taken when the Acts were abolished. Besides the good which the Acts did by restraining the vicious tendencies of many females, and by checking the spread of venereal disease amongst those who had already embraced prostitution as a means of livelihood, there were great facilities for reclaiming fallen women, and through the influences brought to bear on many of these poor creatures during their period of detention in the lock hospital, a considerable number were rescued from their degraded existence and were put in the way of leading honest and respectable lives.

Since the repeal of the Acts there is much greater difficulty both in getting hold of the women, and in bringing counter influences to bear upon them, and the chief reason why these influences so often result in failure is the absence of power to detain, so as to bring in the aid of time to the work of reclamation. The only place in the district set apart specially for the rescue work is a small shelter supported by the Rochester Diocesan Ladies Association, in which girls are voluntarily received and kept, when their physical condition allows, until such time as they can be sent away to homes. There are only three beds in the shelter, but very often they are empty for several days together, and both the matron and ladies who are interested in the work bitterly regret the absence of powers of detention. The matron of this shelter who is intimately acquainted with the unfortunate class, says that there is no doubt that a large increase of prostitution has taken place since the repeal of the Contagious Diseases Acts, and that a very large proportion are young girls, whilst there is also a large amount of clandestine prostitution amongst many females who ostensibly lead respectable lives, but whose morality would be better if the deterrent influence of the Acts still existed. My informant also states that a considerable number of the girls who come into her hands are diseased, and volunteered the remark that she knew of quite 200 such, many of them under 16 years of age; and that although they are prevailed upon in some instances to go under treatment in the workhouse infirmary, they seldom continue that treatment until cured, and in the majority of cases return to their calling whilst suffering from disease. With respect to the ages of many of these prostitutes, the following information taken from the record of work at the shelter is interesting as corroborating the general impression that juvenile prostitution is getting more prevalent. The first entry in the book is in January 1886, and since that period 137 females have been received into the shelter, and out of this number 79, or 58 per

cent., were under 21 years of age. The number admitted at different ages from 12 to 20 years was as follows :—

Age.	Number admitted.
12	1
13	2
14	3
15	8
16	17
17	17
18	5
19	15
20	11
Total	- - 79

Giving an average age of 16 years to 58 per cent. of these prostitutes.

The police who are employed in hunting up truant sailors and marines, and whose duty takes them into the various haunts of prostitutes, state that the condition of the town is far worse than when the Contagious Diseases Acts were in force ; that not only are there more brothels and prostitutes, but as one of the men phrased it “they are a far dirtier lot than in the old times.” During the operation of the Acts these men were practically acquainted with every brothel in the town, now they are constantly finding out fresh ones, and say there are many they do not know of ; and as their daily duty has for many years lain amongst the haunts of soldiers and sailors, no one can be better qualified than they are to judge of the amount of prostitution in the district.

In a letter dated June 16th, 1891—the Stipendiary Magistrate for Chatham and Sheerness writes :—

“You ask for my views, as Stipendiary Magistrate for Chatham and Sheerness, on the effects of the repeal of the Contagious Diseases (Women’s) Acts, with special reference to juvenile prostitution. I am not able to give you any lengthy details, I give therefore a general opinion only. I may say that individually and for private reasons, no one could be more glad than I was to be rid of the cases arising under these Acts. I hated such cases with a hatred greater than I felt for any other class of cases. Nevertheless, looking at the matter on public grounds, I am persuaded that the Acts were beneficial in the districts where I have to administer justice, and that prostitution with all its train of evil consequences is far more rife than it was, disease is more frequent, and especially, juvenile prostitution, notwithstanding what is known as Mr. Stead’s Act, is far more common. This last saddening feature has been before me only too frequently of late, both at Chatham and Sheerness.”

I remain,

Yours faithfully,

E. J. ATHAWES.

The feeling amongst the members of the Local Board of Health, and of the Medway Board of Guardians, has consistently been in favour of the Acts, and has been publicly shown as follows :—

In a letter dated April 17, 1885, and forwarded to the Prime Minister, after being signed unanimously by the members of the Local Board of Health, attention was drawn to the increase of juvenile prostitution in the district, in consequence it was alleged of the repeal of the Acts, and application was made for a renewal of the compulsory provisions of these Acts.

In a letter dated November 30, 1886, written by the Chairman of the Medway Board of Guardians, and unanimously approved by that body, to the principal medical officer of the district—who had requested information for the general commanding as to whether the local authorities were inclined or proposed to take any steps for continuing the use of the lock hospital at the expense of the ratepayers—the following points are noticeable :—

“ While deeply regretting the immense harm done to the community by the abrogation of the Contagious Diseases Acts, the guardians feel that from various causes it would be inadvisable to continue the hospital, which in their opinion would be comparatively useless without those compulsory powers of admission, and detention which constituted the very pivot of the numerous benefits which resulted from the quiet unobtrusive working of the late Acts, as without such powers many women sent from other parts of the district would leave the hospital before being cured, and would remain in Chatham to intensify the evils from which the town is at present suffering.”

In conclusion, the guardians expressed deep regret at the mistake made in the abrogation of the late Contagious Diseases Acts.

On March 16, 1886, Canon Jelf, the then Rector of Chatham, wrote a letter which was quoted in the House of Commons by the late Mr. Cavendish Bentinck. This letter stated that since the suspension of the Acts the following results noted by persons well qualified to judge had occurred :—

1. An increase of juvenile prostitution.
2. An increase of illegitimacy.
3. An increase of physical disease in its worst form.
4. Solicitation in the streets more frequent.
5. Many respectable girls are not deterred as formerly.

Thus far my remarks have tended to show that since the repeal of the Contagious Diseases Acts, there has been a general increase of prostitution in the district ; now for the effect of this increase. With regard to the amount of disease existing amongst prostitutes, at present no exact data can be obtained, but there is no doubt that it is very considerable. Many of these women when they become too ill to any longer ply their trade, seek refuge in the Medway Union Infirmary ; but as soon as they are a little better they go off again, and will rarely stay sufficiently long for a cure to take place. As further bearing on the assertion that juvenile prostitution has increased, it is no uncommon



thing for girls of 14 or 15 years of age to be under treatment in this institution both for gonorrhœa and for primary syphilis.

It is my experience, and also the experience of many of my brother practitioners, and of chemists who do a prescribing trade, that since the repeal of the Contagious Diseases Acts, there is a much larger number of cases both of gonorrhœa and of primary sores amongst young men of the civil population.

But the most important information on this head, because it is absolutely unimpeachable on the score of accuracy, is the information supplied by the Army Medical Reports as to the number of admissions from venereal diseases prior and subsequent to the repeal of the Acts; and these reports at once make apparent the fact that the compulsory examination, and detention when diseased, of the prostitute had a most salutary effect on the health and efficiency of the soldier. The statistics which are here appended relate solely to the Chatham district, and for them I am indebted to the courtesy of the principal medical officer of the district.

The Chatham military district includes Gravesend and Sheerness, but since the year 1888 it has included Shoeburyness and Maidstone, and is now called the Thames district.

I have in the accompanying table left out the two last-named places, which only have a few men, and are of no value for comparative purposes. The figures, therefore, relate to Chatham, Sheerness, and Gravesend, which I shall speak of as the Chatham district, and show the ratio of admissions per thousand of strength both from gonorrhœa and primary syphilis during each year from 1880 to 1890, inclusive.

TABLE showing the Number of Admissions, and Ratios per 1,000, from Primary Syphilis and Gonorrhœa in the Chatham District, from 1880 to 1890, inclusive.

Year.	Station.	Strength.	Admissions.		Rates per 1,000.	
			Primary Syphilis.	Gonorrhœa.	Primary Syphilis.	Gonorrhœa.
1880	- - Chatham	4,031	250	397	62·01	98·48
1881	- - „	3,784	239	368	63·16	97·25
1882	- - „	4,103	292	416	71·16	101·38
1883	- - „	3,002	253	309	84·30	102·90
1884	- - „	3,150	445	420	141·30	133·30
1885	- - „	3,335	461	361	135·80	106·30
1886	- - „	3,334	304	314	91·18	94·50
1887	- - „	3,511	327	387	93·14	110·23
1888	- - „	3,710	357	382	96·12	102·97
1889	- - „	3,427	365	342	104·37	95·07
1890	- - „	3,777	346	305	91·60	80·75

The average ratio of admissions for primary syphilis during the four years, 1880-83, was 70·16 per 1,000 of strength; whilst the average for the next period of four years, 1884-87, when the Acts were repealed, was 115·33 per 1,000 of strength; or if we take the seven years succeeding the repeal of the Acts, we find the average ratio to be 107·66 per 100. In the one case there is an increase of 45·17 per 1,000, and in the other an increase of 37·50 per 1,000.

The average ratio of admissions from gonorrhœa during the four years, 1880-83, was 100 per 1,000 of strength, and for the next period of four years, 1884-87, was 111·08, or for the seven years succeeding the repeal of the Acts 103·30 per 1,000.

The admissions from gonorrhœa have been of a much more fluctuating character than the admissions from primary venereal sores, and, generally speaking, gonorrhœa does not seem to have been so readily affected by the Acts. Another reason is that a very large number of men who contract gonorrhœa do not come under the observation of the Army surgeon, but are privately treated at chemists' shops or elsewhere. In a paper read before the Statistical Society in January 1891, on the operation of the Contagious Diseases Acts, the statistical aspect of the question is fully entered into, and, as my paper is based purely on local experience, I have preferred to confine my figures to local results. It is evident from the above statement that when the compulsory clauses of the Contagious Diseases Acts were withdrawn in 1883, there was a great increase in the number of admissions in the military hospitals, an increase which was due to the increased amount of disease amongst prostitutes consequent on the withdrawal of the benefits conferred on this class of women by the State Lock Hospital. It may be said by opponents of legislation for this class of disease, that the tremendous increase of disease amongst soldiers which immediately followed the repeal of the Acts was not continued, and that at the present time the figures are smaller than in that period; but, although the figures are smaller, still the lowest ratio is considerably higher than the highest occurring before repeal, and I believe the true explanation of this decrease is to be found in the fact that there is more clandestine prostitution, more seduction of young girls—in fact, immorality is not confined to *bonâ fide* prostitutes. Girls who, as I have said previously, were deterred by the Acts, now frequent music-halls, public-houses, dancing saloons, and other questionable resorts, and the consequence is that although they do not in many cases openly practise prostitution, still they are not virtuous; and the fact of there being more unchecked immorality in the town prevents many of the men from associating with the *bonâ fide* prostitutes, with the result that while there is thus a lessening of disease there is a considerable increase of general immorality.

I do not think that even the most determined of the opponents of the Contagious Diseases Acts can gainsay the connexion which undoubtedly exists between their repeal, and the increase of non-efficiency amongst the military from venereal disease; and in the main these statistics are

probably a fair indication of the amount of disease among the celibate portion of the civil population.

One objection to State interference with this class of disease is that it is legalising vice, and as it were encouraging men to immorality from a knowledge of the fact that certain women of loose character were officially sanctioned free from disease; but even if this assertion were true, and I do not think it is true, it is equally true that the Acts had a deterrent influence on many females, preventing them from leading immoral lives, and that they had a decided influence for good both on the manners and habits of the class of women who were brought under their operation.

Then, again, there is another objection, that we are interfering with the liberty of the subject; but if prostitution is a dangerous calling, and nobody denies that it is, then it is quite as reasonable to safeguard such a calling by proper control as it is in the case of any other dangerous trade. Let me here remark that I am no believer in the possibility of stamping out prostitution, which has always existed, and always will exist; and while granting that much may be done by means calculated to promote continence, such as the influence of pure literature, the assiduous cultivation of the bodily and mental powers, and the practice of temperance, still over and above the moral evils of prostitution there are graver ones of a physical character, which not only affect the health of the present generation, but become a serious legacy to succeeding generations; and it is our duty as sanitarians, in the interest of the public health, to point out these dangers, and to use our influence in order to obtain some measure of State control which will render it as penal for a woman to ply a dangerous calling, when suffering from a loathsome disease, as it would be if she exposed herself in the streets when suffering from small-pox or scarlet fever.

We have recently had Acts for the compulsory notification of various infectious diseases, and these are diseases in which as a rule one attack confers immunity for the rest of life. In this respect they resemble syphilis; but the latter disease is far worse in its effects than any of the diseases alluded to, because not only does its power of spreading and of developing fresh symptoms remain when the initial lesion is past, but it is a malady capable of hereditary transmission, while its effects are often spread over a period of many years affecting every organ and tissue in the body; and I submit that on the ground of prevention of disease alone it is our duty to protest against the present method of doing nothing to check the ravages of a disease so far-reaching in its effects.

To sum up the experience of Chatham, where we have had the great advantage of comparing results as to the effect of State regulation of venereal disease and of the absence of such regulations, the following points present themselves:—

1st.—That the effect of the repeal of the Contagious Diseases Acts has been to largely increase the number of prostitutes, and especially of juvenile prostitutes.

2nd.—That the general character of the women is worse.



3rd.—That a very large number are diseased.

4th.—That the amount of venereal disease in the garrison has increased; and that although exact information is not obtainable, there is strong presumptive evidence that disease is more rife amongst the civil population.

With these facts before us there is little difficulty in coming to the conclusion that whatever moral objections might be raised to a State regulation of prostitution there can be no objection to it as a measure of sanitation, and it is chiefly on sanitary grounds that the question is discussed at a gathering of this description. We are met here not to enforce morality, but to prevent disease, and I am strongly of opinion that State interference is necessary both in the interests of present and future generations. From my own observations on the working of the Contagious Diseases Acts I saw nothing to object to, and should welcome their re-enactment, being convinced that they were right both morally, religiously, and hygienically.

Before their introduction in 1862, it was publicly stated by the then rector of Chatham, the late Canon Joseph, that there were over 300 women on the town. In June 1882 this number had been so reduced that there were only 153 on the register.

A lady who has taken great interest in rescue work, and who was allowed to visit the Lock Hospital whenever she chose, wrote as follows, alluding to the working of the Acts :—

“Many girls were rescued, and those who returned to their old way of life were more decently conducted and of improved demeanour. The provisions of these Acts brought influences to bear on a class which could not be reached in any other way, because many of these women, even if found, were often in a state of semi-intoxication, which makes appeal fruitless. Under the calm restraining influence of hospital life, many, who at first were bold and defiant, became gradually more sobered and docile, more ready to listen to appeals, and to embrace means of leaving their hateful mode of life.”

These remarks show that not only were the Acts beneficial to the health of the community, but that the welfare of the unfortunate women was promoted by them; and in connexion with this phase of the subject, I may here remark that at the Chatham Lock Hospital alone during a period of 14 years 835 women were reclaimed.

Now that we have the Criminal Law Amendment Act, I am of opinion that both it and a Contagious Diseases Act would be mutually strengthened if worked conjointly, and in conclusion I would suggest the following points on which it is especially desirable to legislate.

There should be a legal supervision and restriction of prostitution.

Special hospitals should be erected and maintained for the treatment of venereal disease; or (as would be possible in many cases) portions of existing institutions, either poor law infirmaries or voluntary hospitals, might be subsidised in the districts where soldiers are most numerous, and in large centres of population.

Above all, re-introduce compulsory examination and detention of prostitutes when suffering from venereal disease.



## DISCUSSION.

**Dr. Routh** contended that the reports were "cooked," and that some 10,000 boys were included among the 20,000 able-bodied soldiers. The navy reports also were inaccurate. Juvenile depravity increased owing to bad example. The effect of frightening the women who were prostitutes was to increase clandestine prostitution. In Paris there were 7,000 or so registered and 30,000 clandestine prostitutes.

**Brigade-Surgeon Harvey** said that as regarded the British Army in India the latest figures, those for 1889, showed that 474 per 1,000 of the men had suffered from venereal disease, and 36·14 per 1,000 had been constantly in hospital, showing an increase of 13·32 per 1,000 on the average of the preceding five years. Hence, on a strength of 42,000 men, 559 had been put permanently into hospital by the abrogation of the Acts. At Peshawur in March 1890 he found that the authorities had let the hospital remain empty for 15 months, and had practically given up attempting to combat disease. Seventy per cent. of the men in hospital were suffering from venereal disease, but by inducing the diseased women to come to hospital the proportion had now been reduced to 23 per cent.

**Dr. Charles Drysdale** (London) said that the Army statistics were valueless, because they were based on the idea that primary syphilis and venereal sores were synonymous. This was as fallacious as if small-pox and scarlet fever were lumped together. In Paris, and quite recently in Hindostan, primary syphilis had been separated. Secondary syphilis, the only really important venereal contagion, had, according to the Army statistics, risen, as it had in Paris and wherever Acts similar to the late English C. D. Acts were in force. Thus, in Chatham, between 1884 and 1889 whilst so-called "primary venereal sores" had fallen 32 per cent., secondary disease had risen 86 per cent.; and in Paris, whilst soft sores had been affected by police examination, hard sores and syphilis had risen. He would advocate that syphilis should be notified like other infectious diseases. After this, all persons who knowingly communicated the disease to their neighbour should be prosecuted criminally; if unknowingly, a fine should be inflicted.

**Inspector-General Lawson** asked if Dr. Drysdale could give such a definition of simple non-infecting sores as would enable the authorities to separate them with certainty from the infecting. Until that was done the distinction would only obscure the question. Dr. Nevins had jumbled up facts and figures which had frequently no connexion with one another. They had been familiar to him (Dr. Lawson) for years, but were unworthy of confidence.

**Brigade-Surgeon R. Pringle** stated that the C. D. Acts only held out a false security, and, in places that he named, from the disgraceful manner in which they were carried out, one of the diseases they were designed to prevent was actually produced. No medical officer could give that guarantee of safety which was required without spending time over the case, which would necessitate a staff for the purpose. The working of these Acts at Chukrata Dr. Pringle summed up here, as he once did officially, by saying that "it was hard to say whether decency or sanitation were most outraged."

**Mrs. Josephine Butler** said that if the discussion had been confined to the question of physical health she would not have ventured to say a word, although the statistics interested her, as proving that the laws

of hygiene read truly always eventually follow on the lines of the moral law; but Mr. Holroyde had spoken of hospitals and the rescue of women. She did not object either to hospitals or to rescue work, and had had a good deal to do with both. What she did object to was the compulsory and degrading treatment of women who were, under the C. D. Acts, made chattels, not human beings. Women had by their own efforts won victory after victory over this kind of legislation. Its partisans might rest assured that they would not succeed in their attempts to revive it. They would have to work under an increasing fire of opposition from the women of the whole world, who would never relax their vigilance. Women were numerically as strong as men, and morally they were stronger.

**Dr. Chapman** (Paris) said that Mr. Holroyde had entirely ignored the array of authoritative statistics which confuted every point he had raised. The alleged increase in clandestine prostitution at Chatham after the abolition of the Acts he believed to be a misconception. In Paris all women who practised prostitution were registered, and as they detested the system, and also the police tyranny, it was reasonable to suppose that they would become clandestine. Such was the fact, and it was a direct result of the tyranny of the system itself. About 4,000 women were on an average registered in Paris every year, nearly half of whom escaped the police as soon as possible, and had to be replaced by a fresh 2,000 captured to take the place of the fugitives.

**Mr. Henry J. Wilson, M.P.**, said that no attempt had been made to refute or explain away the facts and figures and diagrams of Dr. Nevins, which demonstrated the uselessness of the Contagious Diseases Acts. Mr. Holroyde's paper was full of proposals to deal with women, and women only, and to this Mr. Wilson objected on behalf of the fathers and husbands and brothers of the women of England. But Mr. Holroyde did not say what the local authorities had done to cope with the evils they complained of. Why had they closed the hospital without trying the effect of the voluntary system? How many brothels had they shut up, or tried to shut up? How many prosecutions had they instituted under the Criminal Law Amendment Act in order to stop the seduction and prostitution of young girls? From Mr. Holroyde's silence it must be inferred that no effort whatever of this kind had been made. As regarded the alleged condition at Peshawur a few months ago, he declined to accept verbal statements which he could not verify, while their opponents shirked dealing with Dr. Nevins' figures, taken from sources accessible to everybody.

**Dr. Berdoo** (London) had made it his business to satisfy himself as to the origin of many cases of syphilitic infection, and he had come to the conclusion that the false security offered by protected towns was responsible for the actual propagation of syphilis.

**Mrs. Annie Besant** said that these diseases were unknown in India as a common scourge until introduced by western conquerors. The demand was now to debauch Indian women in order to make English conquerors safe. Hindus loved and honoured women, and the result of this outrage, if carried far, would be to stir up a mutiny, beside which the last would have been child's play, and in which the conscience of the civilised world would be on the side of the Hindu. Opponents of the Acts were told that they must show how to check the spread of disease, and that prostitution was a trade that would last as long as the world. The



way to stop disease was for men to be chaste, instead of sacrificing women to their lust. Prostitution should not last; women, educated women, now were able to use pen and tongue; they identified themselves with these fallen women, their own flesh and blood, and they would form a barrier round them through which men's passions should not break, to outrage and destroy.

**Dr. Nevins**, in replying, said that, as to the alleged increase of juvenile prostitution, &c. in Chatham, in consequence of the repeal of the C.D. Acts, there was not a word in the Acts in the direction of stopping prostitution, juvenile or otherwise, or of reclaiming women or preventing immorality, except the provision of a chaplain while the women are in hospital. The Chatham people did nothing to reduce juvenile prostitution while the Acts were in force, for the numbers were as great at the end of the time as previously, and as to the reclamations, 97 per cent. of all the women went back to prostitution direct from the hospital. As to disease being increased by repeal, it had steadily risen among the registered prostitutes under the Acts from 120 cases yearly among every 100 women at first, to 169 per 100 women for the last three years of the Acts. In India disease under the Acts (which were far stricter than the English Acts) rose from 171 per 1,000 men to 389 per 1000 men in 13 years of full Acts, and now it was said that the repeal of these Acts had produced such an increase of disease!

**Mr. Holroyde** also replied.

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### The Teaching of the Laws of Health in Schools.

BY

ARTHUR NEWSHOLME, M.D., D.P.H., Lond., Medical Officer  
of Health for Brighton.

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Medical officers of health and sanitary inspectors are now appointed in every district, whose duty it is to enforce every precaution against the spread of disease and the removal of local conditions which tend to occasion disease. For this purpose various Acts of Parliament exist. Their enactments cannot, however, be enforced without the cordial support of the local authorities, which are elected by the public, and are, in fact, a reflex of public opinion. It is evident, then, that in order to ensure steady sanitary improvement, the public must be educated up to the necessary point.

*How to reach the public.*—Without doubting the desirability of popular instruction in hygiene for adults, and especially for women, I am convinced that our main hope for the future lies in the education of the children, of whom the major part are in attendance at elementary schools, voluntary or board. Twenty per cent. of the total population is on the registers of public elementary schools, and it is evident that if each of these scholars received an elementary course of instruction in

the laws of health, in comparatively few years an immense amount of useful knowledge would be diffused, which must have a most beneficial influence on the future of this country.

*Economical aspect.*—Most persons can appreciate an appeal which is made to monetary considerations; and even on this ground it can be shown that the present lack of knowledge of sanitary matters on the part of the public is the cause of serious loss to the community. Although the days when infection was regarded as a mysterious visitation, for which fasting and humiliation of spirit were the remedy, and not isolation of the patient, are nearly gone, yet every medical officer of health meets daily with cases in which nothing but gross ignorance can account for culpable indifference to the spread of infection. During 1890, 6,537 cases of scarlet fever were admitted into the hospitals of the Metropolitan Asylums Board. These probably represent about 62 per cent. of the total number of cases of this disease occurring in London. As each case of scarlet fever costs on an average 1*l.* 4*s.* 9½*d.* per week for maintenance in hospital, and as a majority of the cases would have been avoided had the early cases been isolated at the first onset of the disease and kept isolated throughout, it follows that a large proportion of the 56,722*l.*, which was spent in the medical treatment and nursing of these cases of scarlet fever might have been saved. The amount spent in the treatment and isolation of this one disease in the whole of England and Wales, during the year 1889, cannot, on a moderate estimate have been less than 383,474*l.* And yet scarlet fever is the disease in which, perhaps, more than in any other, except small-pox, the importance of precautions against infection is realised by the public. In measles, whooping cough, and diphtheria, carelessness is general, and the loss of life and the expenditure of money which result from this carelessness are enormous.

*Hygienic aspect.*—We are all familiar with the great saving of life that has occurred during the last 15 years from the lowered death-rate which has prevailed; a saving of life which has occurred chiefly at the useful periods of life, and which is undoubtedly due in a very large measure to the improved conditions of life which have followed on sanitary reforms. That we have not reached the limit of possible improvement is evidenced by the large number of deaths from infectious diseases and from tubercular diseases which still occur, but which are entirely removable by isolation of the infected sick, and by the avoidance of overcrowding and dampness. Perhaps one of the most fertile causes of disease is the improper feeding of infants. The story of the ravages of rickets, a purely dietetic disease, has not yet been completely unfolded; but it is known to be directly or indirectly one of the commonest causes of deformity, disease, and death among children. Infantile diarrhœa, which each summer causes a large wave of mortality, is chiefly due to contaminated food; and this, like rickets, might be almost abolished from our list of diseases, if instruction in the laws of health were given in our schools, and subsequently carried out in practice. Many other instances might be given, but time will not permit me to enumerate them.

The saving of life which is still possible by a more general knowledge and application of the laws of health is not the only gain which would follow. The avoidance of sickness is, perhaps, even more important than the saving of life, especially when viewed from an economic aspect. We often hear it said that the diminished loss of life from epidemic diseases is far from being an unmixed good, for weakly children who would in former days have died, now survive to drag on a miserable existence, and lower the general average of health in the community. This statement is altogether erroneous; for, in the first place, epidemic diseases by no means exclusively or chiefly attack weakly persons; and in the next place, this line of reasoning entirely overlooks the essential fact, that for every person killed by an infectious disease, there is a much larger number who survive, but whose health is permanently impaired to a serious extent. There are maimed in the battle of life, as well as killed, and by diminishing the number of the latter we, to an even greater extent, diminish the number of the former. There is still an enormous amount of sickness and mortality in this country, which might be prevented by the practical application of the laws of health in daily life; an end for the attainment of which I can see no more certainly and permanently efficient means than the instruction in the laws of health of the senior scholars in all our schools. Let us examine to what extent this is already being done.

*What is being already done.*—It is possible that in isolated instances instruction in the laws of health may be given, of which we have no record, though it is fairly certain that this is not done to an appreciable extent. Hence, we may take the instruction given in connexion with the Education Department and the Science and Art Department, as a measure of the total instruction in this subject given in Great Britain. I need not stop to discuss the value of the examination test of knowledge, which is made by each of these departments, though I have a strong personal opinion that, notwithstanding its drawbacks, the test by examination is the best hitherto devised, and is, in fact, the only practicable test. Now, the Science Department examines persons of all ages in hygiene; and, as an assistant examiner in this subject, I am able to speak with some knowledge of the good work which is thus being done. But the total number of candidates in this examination, from all parts of Great Britain, is as yet under 5,000 a year; and it is evident, therefore, that the effect upon the community of the instruction thus tested must be somewhat limited in extent.

We may next take the instruction given in hygiene in elementary public schools. The annual return of the Education Department shows that while 88,354 scholars were examined during 1890, in the various specific subjects enumerated below, only 611 were examined in "other subjects," a heterogeneous group which includes book-keeping, German, hygiene, social economy, and Welsh. The number embraced under this group who were instructed in hygiene may be summarised from the fact that under the London School Board hygiene was only taught in one single school, the number of passes obtained being 14.



*Number of Scholars Examined in various Specific Subjects in the Elementary Schools of England and Wales during 1890:—*

Algebra, 30,035; Euclid and mensuration, 977; mechanics, 11,662; Latin, 360; French, 7,232; physiology, 15,842; botany, 1,830; agriculture, 1,228; chemistry, 2,007; sound, light, and heat, 1,183; magnetism and electricity, 2,293; domestic economy, 23,094; other subjects, 611; total, 88,354.

The number of scholars examined in chemistry was 2,007.

The number of scholars examined in animal physiology was 15,842.

The number of school departments in which boys were taught musical drill was 1,414.

The number of departments in which girls have received instruction in cookery classes was 1,554.

The number of girls examined in domestic economy was 23,094.

Chemistry and physiology may be so taught as to have practical utility in daily life. It is only right to state, however, that the syllabus in physiology is such as ensures the maximum amount of technical detail and the minimum amount of instruction in the vital functions of the body and their bearings on health. Cookery is an important branch of hygiene, and one can only regret that so small a percentage receive instruction in this important subject.

Apart from making the laws of health a compulsory subject of instruction in schools, it would be voluntarily taught to a much greater extent than at present were the teachers themselves taught this subject. I am aware that the official answer to this is that female pupil teachers and candidates in training colleges must pass examinations in domestic economy, and that for male candidates school hygiene is included in the syllabus of school management. These examinations are, however, much too incomplete and imperfect to meet the requirements of the case. Students resident in training colleges are taught one or more of the following science subjects:—Agriculture, physiography, mechanics, sound, light and heat, chemistry, electricity, botany or animal physiology; and the result is that they choose out of this list the specific subject for their scholars. If hygiene were once raised to the standard of a compulsory subject of study in training colleges for both males and females the battle would be won, and we should speedily find that instruction in the laws of health would become general in the elementary schools. Even before entrance to the training college the study of hygiene appears at present to be specially discouraged. It is one of the rules of the Education Department that a previous success in one or more of the list of science subjects just given entitles candidates on their examination for admission to a training college to a certain addition to their marks, and helps to raise their relative position in the "scholarship list." Hygiene is conspicuously absent from this list, and if a candidate were to pass in hygiene it would in no wise help his position. It is evident that this state of matters urgently calls for improvement.

To sum up: having regard to the facts that at the present time there is an enormous amount of preventible sickness, with its concomitant pecuniary loss and distress; that the chief cause of this waste of life and money is the ignorance and apathy of the general public in hygienic matters; and that little is being done at the present time to ensure that the next generation shall be lifted out of the present state of ignorance,—I venture to urge: (1.) That the study of the laws of health should be encouraged, and if need be enforced in all schools. (2.) That as a preparation for this all teachers should be required to undergo a course of instruction in the laws of health. In conclusion I append a scheme of a course of instruction in the laws of health for use in schools. It will be noted that in this scheme I have attempted to interweave physiological facts and their hygienic applications. Unless hygiene is taught on a scientific basis, the instruction given must be superficial, easily acquired and easily lost. The only sound practical knowledge is that which is founded on scientific theoretical principles. Hence, although the introduction of technical terms is to be deprecated in the teaching of physiology for this purpose, I am convinced that in all useful teaching of the laws of health the elements of physiology must bear an important part.

#### *Syllabus of Proposed Course of Study.*

A. Preliminary review of chemical facts and of general structure of the body. B. The blood and its circulation. C. The digestion of food:—1. The process of digestion. 2. The varieties of food. Animal and vegetable foods, vegetarianism, milk and its derivatives, mineral foods, condiments. 3. The preservation and cooking of food. 4. Beverages—tea, coffee, alcohol, &c. 5. Water—sources of water, contaminations of water, purification of water. D. Removal of impurities—(1) Respiration—Structure of respiratory organs, mechanism of respiration, chemical changes produced in the blood, and in air; composition of air, impurities of air, importance and methods of ventilation; (2) The skin and kidneys—structure and functions of the skin, importance of cleanliness, baths and bathing; (3) Ash refuse and sewage—the essential points of house drainage, use and abuse of ashbins, &c. E. Maintenance of warmth:—(1) Clothing—relative value of different materials, requisites of clothing, injurious fashions; (2) The house—means for securing its dryness; lighting and warming of house. F. Personal hygiene—exercise, rest and sleep; habits. G. Local conditions affecting health—climate, winds, varieties of soil, drainage of soil, aspect and elevation of house. H. The immediate treatment of wounds and accidents.

## Women's Work in promoting the Cause of Hygiene.

BY

MARGARET ELEANOR SCOTT, Assoc. San. Inst. (Lond.), Lecturer to the National Health Society, Lecturer on Hygiene and Domestic Economy to the Central Classes for Teachers, Marylebone, W.

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### CO-OPERATION WITH MEN.

The vast strides which have been made in hygiene during the past few years have been due to the growing conviction that an intelligent knowledge of hygiene and its kindred sciences is essential to the physical and moral well-being of the people of our land,—that the nation's health is the nation's best wealth.

Such a representative gathering as this Congress, comprising as it does all the experts and most thoughtful men of the day upon matters affecting individual and public health, proves that this conviction is having a practical outcome. Each man present, by bringing the results of his research and experience, shows that he is actuated by the best and highest of motives, namely, a desire to improve the condition of his fellow creatures.

The few words which it is my province to say to-day, however, are more especially to deal with women's work in promoting the cause of hygiene. Congresses on health are most valuable to the advocates of sanitary reform and to those making scientific experiments, but surely it is obvious to all that the efforts of such men will in many respects be almost valueless if unaided by the intelligent co-operation of women.

It is not given to many women to possess that wonderful mathematical ability which last year placed a woman in the unprecedented position of heading the Mathematical Tripos List at Cambridge; but women—all women—do possess an ability which, if trained and exercised, has an immense influence for good upon those dependent upon their household, sanitary, and hygienic knowledge. Co-operation with men implies this knowledge; not a mere vague "rule of thumb" knowledge, but a clear, definite, scientific knowledge, the application of which is necessary to the comfort and maintenance of health in themselves, their husbands, their children, and their servants.

Doubtless each one among us can point to women of our acquaintance who are all that can be desired in this respect, the designers, regulators, and mainspring of health and comfort in their homes; but we must not overlook the fact that these are bright examples standing out among a number of those who are quite the opposite.

Some of these "bright examples" have gained their knowledge by a troubled experience; they have worked out for themselves the solution of many domestic problems as their grandmothers did before them. Knowledge thus gained is very valuable, and not likely to be forgotten, but it is the possession of the few, and it is not based upon a knowledge



of principles. Others, from having studied these principles, have found their work much easier. It must be our aim to make the study of these general, so that it shall be rather the exception to find a mistress of a house ignorant of them.

In domestic economy and hygiene, as in any other subject, a thorough theoretical knowledge of "the reason why" best prepares the way for actual practical work, saves time, and leads to more valuable results.

#### WITH REGARD TO SERVANTS.

Mistresses who are acquainted with intelligent methods connected with cookery, cleaning, the care of children, and the health of the home generally, will find that they have better servants than if they were themselves ignorant. Their servants find that badly performed duties will not be passed over; and they are much more likely to endeavour to improve in the service of a really clever mistress, whilst they would be content to go on in their ignorance, indifferent and careless as to mischievous results, in the service of a mistress who is herself ignorant of vital principles.

#### WOMEN'S WORK OUTSIDE THE HOME, AS NURSES, TEACHERS, LECTURERS ON HYGIENE, &c.

Having spoken of women's work in their capacity as mistresses of the home, let us glance at their work in the cause of hygiene outside the home. Of all the numerous fields of work thrown open to women, I know of none which seems more suited to absorbing a large share of their outside interest than that of spreading a knowledge of hygiene. In town and country the need is the same. Women who make it the daily work of their lives to go about doing good should not forget that the conversion to higher things can scarcely be hoped for whilst the life of the body is endangered by the unchecked presence of the active means for propagating disease.

Women who work as district visitors, as promoters of mothers' meetings, as organisers of clubs for girls, such as the Hon. Maude Stanley's Club, and the Honor Club in London, have innumerable opportunities for making known the simple laws of health, and it is their positive duty not to let these opportunities pass. Let them do their best to save their fellow creatures from ill-health, disease, and pestilence. Let them, by teaching the simple laws of health, and the means of obtaining home-comfort, if not by the actual teaching of household management, endeavour to improve and raise the physical condition of the population.

Trained nurses, who are educated in sanitary matters, whether engaged in district or private work, may do much to quietly promote the cause of hygiene; and many, I believe, impressed with the importance of their mission in this respect, are doing good work.

Teachers in schools, by giving direct instruction in hygiene, may do much to awaken an interest, and to make the girls under them realise the importance of the responsibilities which will devolve upon them in after life.

When distributing the prizes at a large girls' school some time ago, the Bishop of Manchester said, "I would have domestic economy, hygiene, and physiology taught as part of the ordinary curriculum of every girls' school." That remark, I heartily endorse. It is a matter for congratulation that those subjects are being included in the prospectuses of many of our leading girls' schools in England.

The Privy Council on Education, by the encouragement they are giving to technical education, are doing something for girls attending board and other public elementary schools. Direct practical teaching by trained qualified teachers is given in laundry-work, cookery, and needlework. Theoretical teaching is also given in domestic economy and hygiene. In the latter subjects, the teachers give some proof of their theoretical knowledge by passing either the Queen's Scholarship or Government Certificate Examination in domestic economy, or the Science and Art Department examination in hygiene. In the residential training colleges for female teachers a certificate must be signed by the lady superintendent of each college, stating that each student has done some practical domestic work during the year; but from my large experience in training large classes of students, I am in a position to say that the students, in many cases, do not take much interest in the performance of this practical work. It may be that the reason is because no ambition to excel is excited. All their other practical work is tested by examiners and inspectors, the needlework by a lady expert, cookery by an inspectress. Would it not be well if the students knew that their domestic and hygienic knowledge would be also tested by a competent inspectress? Such an arrangement by the Privy Council might have the effect of further promoting the cause of hygiene among the masses by means of the female teachers. No means, however small, should be neglected for getting at the masses. In the past, many thousands have been sacrificed upon the altar of ignorance—ignorance of matters relating to sanitation, diet, fresh air, cleanliness. Those days of actual ignorance have passed away, we hope, for ever. But the awakening is not yet universal.

#### PUBLIC ORGANISATIONS FOR PROMOTING HYGIENE.

Women anxious to do something in this direction have formed "Ladies' Sanitary Associations," and have done valuable work in particular districts, but the matter is a serious national one.

Recognising this, the National Health Society was formed in London some years ago for the diffusion of sanitary and hygienic knowledge among all classes. The work of the society has been growing until it has succeeded in reaching all classes, from the highest downwards. Its teaching is given in the drawing-rooms of duchesses, and in the homes of the very poor. Its secretary, its officers, and most of its lecturers are women. Down into the very poorest districts of London, away into rural villages, the cottages of labourers, outlying school-rooms and farmhouses, they carry the information and practical knowledge which is listened to with eager attention; and not only

listened to,—again and again, have the lecturers found their suggestions and hints being acted upon. We talk to the women in simple language, and they tell their difficulties, and ask advice from the lady who talks to them in such a homely way. As an illustration from personal experience, I may say that after the last such “homely talk” (I will not say lecture), given by myself in Whitechapel, quite 60 out of the nearly 200 extremely poor women present remained behind to ask questions. It was quite pathetic to see how the desire to know how the home may be made and kept healthy exists. I noted specially that the questions nearly always included something about drains. These poor creatures do not know that the best drains are those which require no disinfectants. They do know, however, that they have something called “drains,” and they calmly accept the idea that, being drains, they must emit a bad smell, and so they begged, “Please will you write down the name of that stuff for drains.” The Committee of the National Health Society are not only national in name, but are national in spirit, and their influence has spread to many parts of the country. They would gladly carry their humanizing work throughout the length and breadth of the land, but they need such local co-operation, as has been recently given to them by the County Council for North Devon, by whose arrangement the society sent 15 of their lady lecturers, during May, June, and July, through the county to teach cottage cookery, and the simple means for maintaining a healthy existence. The enthusiastic work of these ladies and their sympathetic and homely method of dealing with the ignorant poor have already produced large results in the increase of home comfort in the Devonshire villages. Paley said, “Virtue is the doing good to mankind”; surely women, who by their teaching are raising the material and moral standard of their fellow creatures, exemplify this.

It is only fair to mention that there are other paths in which, if opportunity were given, women's work in the cause of hygiene might be extended so as to prove of immense practical value. I refer especially to the work which they could perform as Inspectresses of Factories in which women and children are employed. That women's workshops cannot be really efficiently inspected by men is a serious fact;—a fact which has been realised and officially recognised in the United States of America, where women are now employed as Inspectresses. And certainly women's patience in attending to small details might be used to great advantage in probing the evils which are only too prevalent in some of the “sweating” dens of London.

In conclusion, let me once again refer to and emphasise the necessity for that co-operation which is the basis of success when the greatest good for the greatest number has to be considered, the co-operation of men and women. Men, as they should be, are the pioneers of sanitary and hygienic reform; but they may sit in council, they may originate schemes, they may bring legislation to their aid, and they will find that most of their efforts are as a sounding brass and a tinkling cymbal, if they enlist not the sympathies and aid of women. When women are informed and interested they seem to be by nature sanitarians,



and, as Dr. Benjamin Ward Richardson has said, they are allies of the first order ; but when not informed and not interested, they are silent opponents which no man or sanitary board can withstand. Though not themselves eligible for seats on local sanitary boards, in women's hands the health of the nation lies. May we not hope that the impetus given to the cause of health by this Congress will be instrumental in stirring up those women of England who may not yet have realised the responsibilities which are theirs—theirs by right—responsibilities which may be classed, indeed, as the highest privileges, and the noblest of all women's rights, the exercise of which will beneficially affect, not only their immediate circle, but humanity at large. As my paper deals primarily with women's work in promoting the cause of hygiene, I may, perhaps, be pardoned for substituting the feminine for the masculine gender in my concluding words :—

“ Women never nearer to the goddesses attain,  
 “ Than in the art of giving health to men.”

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### The Need for Popular Instruction on Hygiene and Physiology.

BY

WILLIAM BRUCE, M.D., LL.D., Medical Officer of Health for Ross  
 and Cromarty.

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I believe it will be admitted that in no part of Great Britain is the knowledge of the laws of health so rudimentary as it is in the Island of Lewis, in the county of Ross and Cromarty, of which I have the official charge in public health.

Notwithstanding this degrading ignorance, the health of the inhabitants is fairly good. The death-rate per annum, in a population as per last census of 1891, stands at about 120 per 10,000 and the average mortality of preventible disease—in the sanitary sense, that is, of tuberculous and zymotic disease—is the second least in Scotland. This latter statement is merely approximate, as three-fourths of the deaths are not certified by a registered practitioner, and must be, in many instances, mere guesses on the part of the relatives of the deceased. The low rate of mortality must not, however, stand in the way of undoubted sanitary progress, and falls to be accounted for by—(1) a high standard of morality ; (2) racial characteristics ; (3) absence of pressing poverty ; (4) healthy outdoor life ; and (5) it must be allowed, idleness, the natural state of man viewed as a mere animal. I may be allowed to state here parenthetically that the observation of 33 years' medical practice has firmly fixed on my mind that constant physical exertion does considerably shorten life ; that work wears out in time the moving portions of the machine,—first, and chiefly, the heart.

I shall now give a few brief extracts from the district report of my friend, Dr. Macanlay, of Lochs :—

“The average crofter-fisherman’s house is a parallelogram from 50 to 60 feet long and 12 to 13 feet broad inside. The thick walls, which are generally 5 feet high, are built with loose stones and packed with earth. The roof is covered with turf and thatched with straw. Where possible the house is built on a gentle slope, so that the wall of the one end may be from 2 to 3 feet deeper than the wall at the other end. This is the dwelling-house and cow-house in one. The family occupies one half, and the cattle the other half. A person entering such a house about the end of May will notice that the floor of the cattle-half of the house is from 2 to 3 feet lower than the floor of the family-half of the house. This forms the receptacle for the year’s dung, fish offal, and any other refuse about the house. In the beginning of winter the cattle are stabled in this underground receptacle. As it gradually fills with the dung and other organic matter, the cows are raised up until by the month of March the dung on which they stand is frequently a foot or more higher than the level of the floor in the family end. This dung is never cleaned out of the house until it is required in the month of April for potato manure.”

You will think how miserable and shameful! This state of matters must be remedied at once. Note, however, that the population, as I have shown, is healthy as a whole, and that there will be difficulty in procuring the money for improvements; that the habits of the people have been long established; that their miserable crofts are dependent on the manure, yea, on the soot which must be kept dry and under cover in, so terribly wet a climate; and, above all, bear in mind, that the people are ignorant and bigoted in their own beliefs, and you will see that any violent measures of reform will only defeat the end in view.

Are we sanitarians, then, to do nothing? Yes, we can do a great deal if we begin at the beginning, at the schools. But before proceeding further, let me ask, which is the first article of faith in personal hygiene? I cannot doubt that the answer will be personal cleanliness. If we could secure this one condition in its fullest aspect, the whole army of sanitarians might be pensioned off, and no more appointed. The problems in the Lewis are mainly individual, as distinct from social, problems. I speak of things sanitary, of course, but I doubt if I am not correct in the wider and more general sense. Townships are really aggregated rural communities. A township embraces in many cases a great number of acres. This, then, being the real question, viz., one of cleanliness, it must be taught as the first article in the hygienic catechism of schools. How far is it possible so to educate the children there? Are there the means of demonstrating; are there the teachers?

I have personally investigated on the spot the apparatus, so to speak, and I find it lamentably defective. Will it be believed that hundreds of pounds have been lavishly spent on buildings, in some cases half a mile away from a source of pure drinking waters, and that no

proper and sufficient means have been resorted to to obtain a water-supply for such a school and its pupils numbering, it may be, hundreds?

In the county of Ross and Cromarty, fully one-half of the public schools have no proper water-supply. Just think of that pregnant fact, and consider the probable sanitary condition where so many children are compelled to spend a large portion of their lives.

The privy accommodation is often constructed on bad lines, and, as a rule, the emptying is done at long intervals, and the receptacle and its surroundings are badly kept. Urinals are almost always ill-planned, and no attention paid to them whatever. Such conveniences are a necessity for very young girls.

An abundant supply of water is first of all needed. Then water-closets may follow, but, as a rule, privies, for obvious reasons, must still remain; and lavatories, and by-and-by, baths must follow. In the meantime privies must be constructed on proper principles. They must be situated in the right place, not too near the schoolroom or teacher's house, and hidden away if possible, but yet accessible.

In some cases the children are absolutely shut out, so that these receptacles may not become a nuisance but may be in proper order against the inspector's annual visit. In others for divers reasons, but principally because they are too obtrusive, the children do not take advantage of them. All this must be remedied.

And now we come to the second desideratum—the absolute and imperative need for steady, systematic supervision. The schoolmaster must consider the practical enforcement of sanitary work in his school as a most important portion of his duty. The way to secure this devotion of his time and attention is to make it pay to do so. A certain proportion of the Government grant should depend on (say) quarterly reports made by the district medical officer of health.

The teacher ought to look upon his school and its economy as a wise householder looks upon his or her house. Miss Nightingale lays it down as a rule never to be broken that every housekeeper should every day inspect every part and corner of her establishment. So should every schoolmaster who has once grasped the idea that he—more than anyone except the parents—has in his hands the moulding of the moral and individual character of his pupils.

To teach with interest and advantage it will be necessary that the teacher himself be well versed in the knowledge of physiology and hygiene. Both must be studied practically, but especially the latter. At South Kensington and elsewhere classes are doubtless formed to suit the period when schoolmasters are free to attend. Having thus become fitted, he must put his knowledge into practice. Nowhere is ventilation more important than in schools, and yet, in too many instances, are the simple rules too often neglected; and so also with regard to heat. There is frequently deplorable ignorance displayed in this respect.

In working out hygienic rules in schools, teachers must trust a good deal to some modification of the monitor system. Ordinary immorality,



so-called, is, I have already said, rare in Lewis. But "the quality of mind must be low where dirt and filth abound, and the disposition to grovel leads to idleness and fatalism." Civilization will follow more closely and steadily in the wake of the schoolmaster if he cultivates the graces both of mind and body in his pupils, and if his motto be "Nihil est quod humanum a me alienum puto."

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### Hygiene for the Zenanas of India.

BY

Surgeon-General C. R. FRANCIS, M.B., M.R.C.P., Delegate from the National Indian Association.

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More than 20 years ago Miss Carpenter, sister of our renowned physiologist, hearing much of the low social condition of the women of India, determined, although then in the seventh decade of life, to go and see for herself, in view to, if possible, its amelioration. She founded, in 1870, the Association,\* of which the Princess Alice became the President, and which is now under the patronage of the Princess of Wales. Miss Carpenter, being much impressed with what she saw, viz., amongst other things by the great need for female education and improvement and for better sanitation, paid other visits to India, but died in 1877. Stimulated by her example and exertions, the Association has spared no efforts to carry out her views; branches have been established in some of the principal social and educational centres, an active interest being taken in them by high official authorities; its magazine has been utilised for conveying information on the best means of preserving health in India; and its promoters may fairly be congratulated upon the progressive fulfilment of the objects with which the Association was founded. Following Miss Carpenter's example, the honorary secretary, Miss E. A. Manning, paid a visit to India in 1888, to inspect the several branches, and to bring them more into rapport with the parent institution at home.

Nearly half a century ago, the Government of India tentatively initiated the experiment of sending four intelligent young native gentlemen of good caste to England, to study medicine under the superintendence of one of its ablest medical officers, Dr. H. H. Goodeve. The experiment was eminently successful; and the door being thus opened, other young Indian gentlemen voluntarily came to England, from time to time, for the same purpose. Now they come in increasing numbers to study not only medicine, but various callings which, it is hoped, will, on their return to India, be of use to themselves and to their country. To all who wish to avail themselves of its aid, the National Indian Association is prepared to stand, as it were, *in loco*

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\* Subsequently called the National Indian Association.

*parentis* ; to provide them with suitable accommodation, to show them the best side of English society, and to introduce them to a knowledge of such institutions as may especially benefit them. It is to be regretted that, in some cases, these gentlemen come too young. And here I would urge that all medical students from India should be encouraged to thoroughly study hygiene.

It is somewhat remarkable that, although the natives of India, the Hindus especially, attach great importance to personal ablution, which is indeed a religious obligation, they do not seem to recognise the necessity for healthy surroundings. The management of the lying-in chamber is a striking illustration of this. Indian mothers look upon fresh air as positively injurious to the infant, and to exclude it as well as the possible entrance of malignant spirits, they take infinite pains to close every door and window, and to fill up every crevice ; so that there is a complete absence of ventilation, the room resembling, says Kunye Lâll Dey in his "Hindoo Social Laws and Habits," "an hermetically sealed box." In this darkened chamber—a large fire burning in the centre even in the hottest weather—the mother and child remain, inspiring a vitiated atmosphere for 21 days, till the ceremony of the *Shūsti pūja* is performed. Imperfect ventilation is, indeed, a characteristic feature in all Hindu dwellings. The sitting and reception rooms of a native house in Calcutta intended for the male members of the family are comparatively spacious, as is the *dalān*, or hall for the celebration of the *pūjas* and festivals that take place on the premises. There is also a court-yard for *nāches* and other entertainments. But, in the *untuppoor* (zenana or female apartments), in which the men are apt to sleep half their time away, a very limited amount of breathing space, much less than the quantity considered necessary in a tropical climate, is allotted to each individual. And, in the immediate neighbourhood, are the cooking rooms which have no proper outlet ; the *austakoor*, or place to receive their refuse—a kind of dust-bin ; odious privies, too often left uncleaned ; wells sunk almost directly beneath these privies ; the tank for the women who here wash their clothes and themselves ; in short, an abundance of impurities, the contemplation of which led a well-known practitioner some 50 years ago to write that it would be difficult to find, in any city, "more fruitful and fatal causes of disease and death concentrated within narrower limits." An improved water supply and better drainage—the sewage of Calcutta is now drained away into the Salt Lakes,\* instead of being deposited (as formerly) in the

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\* The liquid sewage is conducted by a main sewer into the circular canal, whence it is supposed to find its way into the tidal Bidridhuree river (which is practically an arm of the Bay of Bengal), there to be tossed about and finally deposited at high tides in the Salt Lakes, with which the Bidridhuree communicates. The system is considered by eminent medical authority to be very unsatisfactory. The liquid sewage, it is urged, should be made to discharge at a point much lower down—into an arm of the sea which does not communicate with the Salt Lakes, nor with the country near Calcutta. The "dry sewage" (street sweepings, &c.), all that the sewer does not carry off, is conveyed by municipal carts and by railway to an area of municipal land about a mile square, where it is laid down in layers from eight to ten feet in thickness, thus raising the land which originally was very low.

river (the principal drinking water of the city) at the rate of 180 tons a day—have greatly contributed to improve the health of the city generally, notably in the diminution of cholera. But these reforms, though appreciated by the native community, have been introduced by the ruling power; they are not the result of the growth of native public opinion. And I am not aware that, as yet, there is any material difference—so conservative are the people and so indisposed to brook any change that affects the *Ma Bāp ka dustoor* (ancient customs)—in the insanitary condition of the houses, and their immediate surroundings. Let anyone take a walk through the Tiretta *bazaar* (in the northern quarter of Calcutta) at day-break before the inhabitants are astir, and he will probably see men asleep (in the hot season), as I have, on *chārpāis* (country bedsteads) placed in front of the houses, close to, if not directly over, one of the open street drains, which are not always only water drains. Can it be surprising that cholera should be endemic—about 4,000 on an average dying annually in the past? or that the natives should have so little stamina wherewith to resist it? As a matter of fact, 92,520 were swept away by the disease in 20 consecutive years. With improvement in the hygiene of the home, the mortality from this disease would be still further diminished.

We sometimes wonder why our military cantonments, upon the public buildings in which so much money has been expended, should become unhealthy. In some cases there may have been physical objections, perhaps overlooked or insufficiently considered, to the site; or, possibly, other causes beyond human control may have unexpectedly supervened. But, in others, more frequently too than the European authorities are aware of, the unhealthiness is of the natives' own causing. For example, cholera appears in a bazaar in cantonments; and, upon the advice of the administrative medical officer or staff surgeon, a temporary hospital is erected a sufficient distance off from the cantonment for the reception of such cases. But, not unnaturally, the sick do not like to be taken from home, and the occurrence of cases is therefore not reported. The inmates of the infected house "lie close," and the cholera dejecta, instead of being disinfected, removed to a distance and there buried, are either thrown into a corner of the premises or placed in a shallow excavation hurriedly scraped out for the purpose in the immediate vicinity of the house. I have met with a similar case when marching with an irregular cavalry regiment. A trooper, seized with diarrhœa, the preliminary symptoms, apparently, of cholera—had the dejecta buried in his tent.

The amount of crowding in the sick chamber is often excessive. Fresh air, so essential to the prevention of ante-mortem clots (embolisms), an occasional cause of sudden death after surgical operations—is the last thing thought of when such a catastrophe is threatened. In some parts of India, in the comparatively low and damp parts particularly, *e.g.*, in Bengal proper, *phthisis pulmonalis* is not uncommon amongst the women; and without doubt, overcrowding in small rooms contributes to this. Men also thus suffer in the same localities.



The feeding of infants, whose "stunted growth, constant sickness, and early death" is often due, says Kunye Lâll Dey, to the substitution of inferior *meethaees* (sweetmeats) for the mother's milk at the time of weaning, and to the free consumption of immature fruit, is a subject upon which the mothers of India require much enlightenment. About 30 years ago a lecture was given, in Calcutta, by a native gentleman who advocated the use of butcher's meat and alcoholic drinks by Bengalees; urging that, as such a dietary gave strength to Europeans, his countrymen would do well to adopt it. Mistaken counsel! And the increase of liver disease during the past 25 years, amongst the Bengalees and others who have followed it, only too certainly proves its fallacy. The lecturer, who overlooked the fact that Britons owe their superior physique, in the first instance, to a Northern clime, would have given better advice had he recommended his countrymen to adhere to the simple vegetarian diet suitable to a tropical climate, to indulge less in sweetmeats and *ghee* (clarified butter), and to abstain altogether from every description of alcoholic drinks, which tend to *reduce* the strength of Europeans and of all who use them.

How best to counteract the influence of malaria and of impure air and water—the natives are familiar enough with the *effects* of these agents, as is evident from the expressions "*huwa\* lug gya*" "*panee† lug gya*"—is another lesson of paramount importance.

The opening, now offered through the instrumentality of the "National Indian Association," for instructing Indian mothers in the laws of health in a familiar and unscholastic way in their homes, as also to girls at school who in due course will become mothers, is one that, if judiciously utilised, may bear excellent fruit; for, after all, the women are at the root of all social reformation and progress.

The Association has acted as a pioneer in originating and quickening the movement for providing skilled female medical aid for the women in the zenanas, into which no medical *man* has ever been allowed to enter, and who were, therefore, hitherto dependent upon such professional assistance as could be obtained from their own sex in India.

This indigenous assistance is now known to be of the worst possible description. The subject having been ably dealt with in the "Contemporary Review" by a medical lady, Dr. Frances Hoggan, the "National Indian Association" took it up. Meetings were held under its auspices; an impetus, fostered by the Queen herself, was given to the project for sending to these poor women thoroughly well taught lady doctors from England, and for educating the native midwives (*dhāees*). The entire scheme was thus well ventilated, and, at length, through the benevolence of Mr. Ketteridge, of Bombay, supplemented later by that of several Parsee gentlemen, it assumed a definite shape. A hospital for the reception of native female patients was established;

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\* "The air has struck me."

† "The water has struck me."

and an income, for three years, for two accomplished lady doctors from England was guaranteed.\*

The scheme, thus initiated, commended itself to the wife of the then Viceroy, the Countess of Dufferin, who, with the sanction of the Indian Government, and cordially assisted by local authorities and medical officers, and by native princes and gentlemen in various parts of the country, has completed the foundation of a great social reformation.

Provision had already existed for the treatment of women in some of our hospitals and dispensaries; but the doctors have been *men*. Women of high caste—*purda nishins*—(screened from the public gaze) would not avail themselves of it. For these hospitals are being established; and either in them or at home they have now the opportunity of receiving, when ill, the best possible professional treatment at the hands of their own sex.

I would urge that all female medical officers should be thoroughly well informed in the subject of sanitation and the laws of health, so as to be able to impart their knowledge in a pleasant popular way to the inmates of zenanas. Lady doctors from England might be encouraged, as well as the male medical students from India, to take the degree in State medicine required for sanitary medical officers in England.

A strong impetus is being given, and in this the "National Indian Association" takes an active part, to the school education of Indian girls, and it is certainly very desirable that hygiene should be included in the curriculum of study for girls as well as boys, especially in normal schools. Indian girls are remarkable for their zeal in learning whatever they are taught, and there is no reason why they should not, by-and-by, excel in teaching this subject, as some of their sisters excel in other intellectual efforts.

Why should not our sisters in India, when sufficiently educated, work as zealously and as effectually for their country as so many noble women in England (amongst whom stands prominently forward one who, 37 years ago, gave so powerful an impulse to the subject that brings men and women of various nationalities together to-day—the Hygeia of England, Florence Nightingale) have done for ours? A valuable sanitary primer, called the "Way to Health," has been published (in English) for the Education Department in the Punjab, and, on the representation of the "National Association for Supplying Medical Aid to the Women of India," the Indian Government have published a new edition, with translations of the work. A text book on domestic economy and sanitary science for the use of the senior classes of English and vernacular schools, which gained the reward of

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\* Prior to this, the idea of giving a medical education to Indian women had originated in Madras, and Surgeon-General Balfour had induced the Madras Government to throw open the Medical College to them. Mrs. Scharlieb, who has since distinguished herself at the University of London and in other ways, was one of the first students.

a thousand rupees offered by Government for the best treatise on the subject, has also been published.\*

These are excellent publications, likely to do much good as text books in the higher schools; but there is room, I venture to think, for others (in the vernacular) suitable for elementary village schools and for use in the zenanas. In this connexion lady doctors for India would do well to examine the works published by the "National Health Society" and by the "Ladies' Sanitary Association." The natives of India are very fond of proverbs and stories. The *kuhāni-wāla* (story-teller) is always a welcome visitor in inns for travellers, and wherever people congregate; books, therefore, on hygiene, published on these lines, would, I believe, be very popular. I speak from personal experience.†

There is one important point in connexion with the laws of health which should not be overlooked, viz., the physical development of the body in athletic exercises. These should, always, be apportioned to the capacity of the individual. Sufficient care in this respect is not always taken, even in England; and, in consequence, it occasionally happens that the life of a lad who might otherwise have grown up into a fairly strong man is embittered, if not shortened, owing to the germs of disease—the result of too rough exercise—being laid before the body was fully formed. If this be so in a race remarkable for a powerful physique, how much more is it necessary that care should be taken in tropical regions where the youthful frame is, as a rule, so much inferior.

There are other subjects which, though not usually included under the head of hygiene, might well be taught to the youth (of both sexes) of India in connexion with preventive medicine. One of these is the extermination of poisonous snakes which, in conjunction with wild animals, annually destroy their thousands. Under the present system a reward is given for every dead serpent brought before the magistrate or civil authority of the district. But this plan does not, apparently, effect an appreciable reduction in the mortality. This is not surprising when it is remembered that a cobra-di-capello lays from 18 to 20 eggs at a time, so that, for every one captured a large number remain at liberty. I advocate, therefore, that the eggs of snakes—these are to be found in the neighbourhood of old walls and where the sun can reach them—should be secured. There is at present an obstacle to any extensive capture of snakes in the attitude of the people themselves, who offer religious objections to their destruction. Supposed to be associated with Dcity, they are, in some parts, well cared for, and even worshipped. The low caste natives, therefore, who will alone undertake the work of extermination, receive but scant assistance from the

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\* A similar work has recently been prepared by Mrs. Brander, Senior Inspectress, for the use of teachers in the Madras Presidency.

† I once published a pamphlet of the kind, which remained for many years a text book in the village schools of the North-Western Provinces, serving as a pioneer for a more comprehensive publications. Destroyed during the mutiny of 1857, it was afterwards reprinted under the orders of Government.



community at large. But, as with progressive enlightenment, this superstition, with many others, will disappear, and the true character of these reptiles be clearly understood, we may reasonably hope that the individual slaughter, now conducted at such a disadvantage, will give place to a more comprehensive system of extirpation. The only other egg which is likely to be mistaken for a snake's is the lizard's, but there is really no difficulty in distinguishing between them. The snake's egg (oblate and white) has a soft but toughish leathery covering, whilst the lizard's has a hard shell. To distinguish between the eggs of poisonous and non-poisonous snakes is, however, impossible. But in a case of this kind there need be no compunction in destroying the innocent with the guilty.

The work of introducing preventive medicine amongst a people who believe that almost all disease is sent by angry gods, powerful demons, or evil spirits, must necessarily advance *pari passu* with religious as well as general enlightenment. Happily, sanitary measures, partial or complete, introduced into some of the larger towns, have met with no serious opposition from the natives; *e.g.*, they will drink and otherwise use water conveyed through pipes, though they will not use it for religious ceremonies; but the stronghold of custom and prejudice is in the *home*, the assault and carrying of which, by gentle methods peculiarly their own, can best be undertaken by women—the medically educated and noble-hearted daughters of the United Kingdom.

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#### DISCUSSION.

**Mr. Washington Lyon** (London) agreed with Dr. Newsholme that if we expect to spread the important principles of hygiene amongst the masses, it must be done by teaching "the laws of health in schools." A knowledge of these should be made a leading subject in the examinations of children. He suggested that candidates for municipal honours might be questioned as to their knowledge of the principles of hygiene and kindred subjects, so as to fit them to sit on sanitary committees. He referred with praise to Miss Scott's paper on "Woman's Work in promoting the Cause of Hygiene," and pointed out the importance of women's aid in promoting the progress of hygiene. He thought the account given by Surgeon-General Francis of the progress in sanitary matters in India was most satisfactory. Although it was only a very short time since the first lady doctor (Miss Peachey) went to Bombay, she is now at the head of a large hospital there, teaching the principles of hygiene to the native women.

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## Popular Instruction in Preventive Dentistry.

BY

GEORGE CUNNINGHAM, M.A., Lecturer on Dental Surgery in  
the University of Cambridge.

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The greatest difficulty with which dental practitioners have to contend is the want of knowledge and appreciation of the functional value of the teeth and of the care necessary for their preservation. Decay or caries of the teeth is not only the disease which dominates dental pathology, but it is also the most prevalent of all diseases affecting man. It is in a very special sense a disease of youth, though it is not confined to that period of life.

Recent statistics have proved that if we examine the mouths of say a hundred children between their second and fifth year, only one third of them will possess dentures free from caries. In examining the children during a later period of school life, we find that the proportion of defective permanent teeth and those already lost, varies from about 100 per cent. in the best schools to over 430 per cent. in the worst. When we remember that this amount of disease is found amongst permanent teeth which must have been only recently erupted, and recall the average condition of the teeth of the child on entering this period of school life, we can imagine the enormous amount of disease existing in the mouths of children during the prolonged period when the teeth are being changed.

An examination of 4,062 school children showed that of the permanent teeth 10,330 were either carious, already extracted, or in such a condition that extraction was the only remedy. Without regarding these temporary teeth which it was deemed inadvisable to treat on account of their approaching fall, 6,321 were marked as requiring treatment, most of them of course by extraction. In the total number of children at the age when they should have a complete denture with the exception of the third molars, it is found that only something like 10·5 per cent. of them had dentures free from caries, and some of these so-called perfect mouths presented either slight irregularity, remnants of the baby teeth, deposits of tartar, or required thorough cleansing. An examination of recruits for the army between the ages of 17 and 25 years, showed that each man on the average had lost 1·05, and would be the better for losing 2·31 (altogether 3·36 teeth already lost) and had 4·09 carious teeth capable of preservation by conservative treatment, thus giving a total of 7·45 defective teeth per man.

Caries affects all classes, for, although these statistics have been necessarily derived from institutions which represent the poorer classes of the community, the limited statistics yet at our command seem to indicate that matters are even worse amongst the well-to-do classes; but only a small percentage of the cases are too absolutely hopeless to be

beyond the limits of remedial conservative dental surgery. The curability of dental caries is very great, as Magitot has shown by statistics compiled in an open clinic that extraction was only necessary in one per cent. of the teeth attacked, calculated on a total comprising a large number of teeth. Were the treatment of the disease undertaken early enough, that is to say in its incipient or even in its second stage, extraction might only be necessary in something like 1 per 1,000. Caries therefore is almost a preventible disease, one might say even wholly preventible, if we regard treatment in the incipient stage as prophylaxis, for a large number of teeth are erupted in such a condition that a certain amount of caries is absolutely inevitable. The benefits of conservative dentistry have hitherto been confined almost entirely to the smaller and richer section of the community. As Sir John Tomes has pointed out, the problem as to how adequate medical and dental attendance can be rendered to the poor cannot be solved wholly on the same lines, for where one person requires medical, ten will require dental assistance, and where ten minutes may be spent in effecting medical treatment, several hours must be spent in effecting dental treatment.

"It cannot be doubted that mastication is necessary to health, and "that sound teeth, natural or artificial, will alone effect proper mastication." Any scheme for the saving of the natural teeth, or the supply of artificial dentures for the replacement of the lost teeth for moneyed workers must necessarily be one of slow growth and development. But it would be very easy to organise a scheme of popular instruction in preventive dentistry which, besides achieving immediate and certain results which are far from being despicable, would effectually create a demand for some system of provident dental service. The need for popular instruction in hygiene and physiology in regard to health, while far from being adequately supplied, is still very largely recognised. Curiously enough the care and treatment of the teeth is, as a rule, conspicuous by its absence from those series of health lectures which have been already established.

Hygiene of the mouth should form an important, if not an essential part of any scheme of popular instruction which claims to be complete and thorough. That "prevention is better than cure" is as true of caries as it is of other diseases. The means of prevention are simple, the materials cheap, and thus within the reach of almost all, but the knowledge which should guide the application of prophylactic measures is possessed by only a relatively small portion of the community. The intelligent understanding of the construction of the human denture and of the causes which lead to its destruction must precede any general and thorough application of those measures recognised as calculated to promote its growth and development and to maintain its integrity. Popular lectures, as free from technicalities as possible, profusely illustrated by means of the optical lantern, are valuable means towards this end. Experience has shown that large audiences of even the poorest classes are capable of appreciating such lectures in an almost extraordinary way.



[Mr. Cunningham showed a beautiful set of slides exhibiting—

1. A tooth and its component parts.
2. How, when, and where the teeth are built up.
3. The temporary teeth and the consequence of their premature removal or undue retention.
4. The permanent teeth, and the necessity of special attention to the first molar.
5. The complete denture, how it is spoilt or ruined by decay or caries, and indiscriminate extractions.
6. Causes of decay, its progress and its ultimate effects.
7. Tartar and its effects on the teeth and gums.
8. The effect of smoking on the teeth.
9. "Painless and perfect dentistry."]

In a discussion on the "Compulsory Attention to the Teeth of School Children" so ably advanced by Mr. Fisher before the British Dental Association in 1887, I advocated the publication of a work on "Physiology and Hygiene" as a kind of advanced Reader for school children. Such a Reader would, of course, include chapters on the formation and care of the teeth. This is a subject which might also be included in the scope of that most excellent adjunct to our educational institutions, namely, the National Home Reading Union.

Finally, I would direct attention to a remark made by Sir Morell Mackenzie, when presiding at a lecture to some 750 men and women in the Royal Victoria Hall, namely, "that a judicious exposition of the treatment and the decay of the teeth, if acted on by the masses, would probably do more to improve the national health than many more ambitious designs."



Mr. Lithiby proposed, and Dr. Barry seconded, the following *Resolution*, which was carried by acclamation:—"That the cordial thanks of this Section be conveyed to Professor Vilanova y Piera of Madrid, Dr. Hewitt of Minnesota, U.S.A., and Dr. Guillaume of Berne, for valuable works relating to matters connected with the Public Health, which they had presented to the Congress."



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